SCHOOL OF PSYCHOLOGY

DOCTORATE IN CLINICAL PSYCHOLOGY

MAJOR RESEARCH PROJECT

Mindfulness-based Stress Reduction as an Intervention for Insomnia Symptoms

Submitted by Dr Louise Baker-Martins, to the University of Exeter in part fulfilment for the degree of Doctor of Clinical Psychology, March 2018

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: L.D. Baker-Martins

Author's Declaration

The systematic review was completed independently by the author with the involvement of a peer reviewer as stipulated in the guidelines. All data collection, transcription, analysis and write-up involved in the empirical project was completed by the author. Peer reviewers were involved with the analysis process in adherence with recommendations for qualitative methods. Participant recruitment was facilitated by the field collaborators; S.H and B.M whose names have been anonymised in this thesis to protect participant confidentiality.

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LITERATURE REVIEW

Mindfulness Based Stress Reduction for Insomnia Symptoms: A Systematic Review of the Evidence

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Abstract

Background: Insomnia is an increasing public health epidemic, affecting healthy, sub-clinical and clinical populations. Cognitive Behaviour Therapy for insomnia (CBT-I) is the most evidence-based treatment endorsed by the National Institute of Clinical Excellence (NICE) which provides guidance to health and social services in England. Research has demonstrated, however, that CBT-I has low or uncertain efficacy within various populations including those with coexisting health problems and clinical diagnoses. Furthermore, CBT-I is not accessible to most people due to poor prioritisation within services and a paucity of clinicians skilled in insomnia treatment. There is an urgent need to develop alternative interventions for this persistent and highly debilitating complaint. Acceptance based approaches to insomnia including mindfulness-based stress reduction (MBSR) provide an alternative model for holistic treatment of sleep distress.

Objectives: This review summarises and synthesises the available literature investigating the effectiveness of MBSR as a treatment for insomnia in community and clinical populations (with some specific populations excluded).

Method: Systematic review of all relevant quantitative and qualitative literature to date using PsycINFO, PsycARTICLES and Web of Knowledge databases.

Results: 13 relevant articles were included (3 abstracts): randomised control trials (RCTs), experimental, quasi-experimental and qualitative studies.

Conclusions: Overall, the limited research in this area was assessed to be of moderate quality and to provide preliminary evidence that MBSR offers an effective intervention for insomnia symptoms and disorder in various populations. The review highlighted the paucity of research specifically

investigating the acceptability of MBSR as an insomnia treatment, particularly for more complex presentations. It is possible that MBSR provides holistic and bi-directional benefits for sleep and emotional well-being, however, further research is required to determine *how* participants experience the course process in relation to their sleep.

Keywords: Insomnia, CBT-I, MBSR.

Introduction

Insomnia symptoms are increasingly recognised as a growing, cross-generational, global health epidemic (Stranges, Tigbe, Gómez-Olivé, Thorogood, & Kandala, 2012; Henry, Rosenthal, Dedrick & Taylor, 2013). Despite this, treatment has historically been undervalued by both patients and professionals, often leading to chronic and persistent illness trajectories (Morin et al., 2009).

For many individuals, transitory nocturnal symptoms of insomnia are normal and involve difficulty falling asleep, maintaining sleep and/or early morning awakenings, attributable to factors such as stress, pain, medical problems, unhelpful sleeping environments and poor sleep hygiene (Ellis, Gehrman, Espie, Riemann & Perlis, 2012). These symptoms may constitute short-term insomnia (< 4 weeks), which is associated with a dispositional increase in stress reactivity in response life stressors and a significant underlying sleep debt. There is a perception of having inadequate resources to cope or a loss of actual resources necessary for effective stress management (Harvey, Gehrman & Espie, 2014). Acute insomnia may be experienced within, or as separate to, a chronic dissatisfaction with sleep (Fernández-Mendoza et al., 2009).

For a diagnosis of insomnia disorder, daytime distress and impairment (e.g. social, occupational or behavioural) persists for at least three nights a week, over the course of at least three months. The persistence of insomnia is predominantly due to hyperarousal within cortical, physiological and cognitive systems (Riemann et al., 2010), and is not attributable to another medical or sleep-wake disorder, substance misuse or the effects of medication (American Psychiatric Association; APA, 2013).

Prevalence rates of insomnia are unreliable due to the challenges implicit in accurately self-reporting sleep, historically inconsistent definitions of insomnia, and divergent measurement tools for assessing sleep quality (Ohayon, 2002). However, findings that one third of the general adult population in Western countries experience insomnia symptoms at least once a week is a robust, if conservative, finding (LeBlanc et al., 2009; Léger & Poursain, 2005, Sateia, Doghramji, Hauri & Morin, 2000). A cross-sectional study by Ohyaon and Reynolds (2009) of 25,579 individuals aged 15 and over, reported that 34.5% of individuals had at least one symptom of insomnia (9.8% were found to have a clinically significant problem). The significance of treating insomnia early was highlighted in the longitudinal Nord-Trøndelag Health Study (N= 24,715) which found the incidence of insomnia at time one was associated with incidence of anxiety, depression and help-seeking for mental illness 11 years later, controlling for demographic variables and physical health problems (Sivertsen et al., 2014).

A National Sleep Foundation survey (2006) reported that in the UK 19% of working age adults achieved between six and seven hours of sleep per night (16% < 6 hours) and that this resulted in 64, 447 full-time working days lost (87, 372 for those <6 hours) per year. A recent RAND report calculated that the UK sustained an annual economic loss of £36 billion (1.86 of its GDP) (Hafner et al., 2016). Given the high personal and economic burden of insomnia and the impact across healthy, sub-clinical and clinical populations, research into improving the acceptability and efficacy of psychological treatments for the complaint is imperative.

Changes made in the Diagnostic and Statistical Manual of Mental Disorders (5th ed; DSM-5) criteria for insomnia have important implications for research investigating the efficacy of psychological treatment interventions. Specifically, the causal distinction of 'primary' and 'secondary' insomnia in relation to co-occurring mental and physical health complaints is no longer upheld as clinically valid (APA; 2013). Historically, this categorisation led to under-diagnosis and undervaluation of treatment due to insomnia being conceptualised as a diagnosis of exclusion or as 'less important' than co-occuring complaints (Black & Grant, 2014).

A diagnosis of 'insomnia disorder' is now instructed regardless of the level of complexity, and with an awareness of the interactive effects of sleep with a wide range of co-occurring health difficulties. Research has established that insomnia can precede and predict the onset of other mental health conditions, can exacerbate co-existing conditions and persist beyond remission of co-existing conditions (Sutton, 2014). Insomnia should, therefore, be prioritised for independent clinical attention and treatment should be guided by the level of complexity as indicated by a comprehensive psychological formulation.

Historically, treatment efficacy research has predominantly involved populations with a diagnosis of 'primary insomnia,' uncomplicated by other health factors. This means that the effectiveness of 'gold-standard' interventions for 'insomnia disorder,' as it is now conceptualised, is unclear.

Behavioural and cognitive models of insomnia

Aetiological and maintenance models of insomnia converge on the understanding that the condition is characterised by dysregulation to arousal systems (Bonnet & Arrand, 1997). Spielman and Glovinsky's biopsychosocial model (1991, see Figure 1) has received much empirical support for the identification of processes involved in the transition from acute to chronic insomnia. Predisposing factors for insomnia may be dispositional (e.g. anxious temperament), precipitating factors include life events (e.g. exam stress or divorce) and perpetuating factors include maladaptive behavioural coping strategies (e.g. watching late night television and conditioned autonomic arousal).

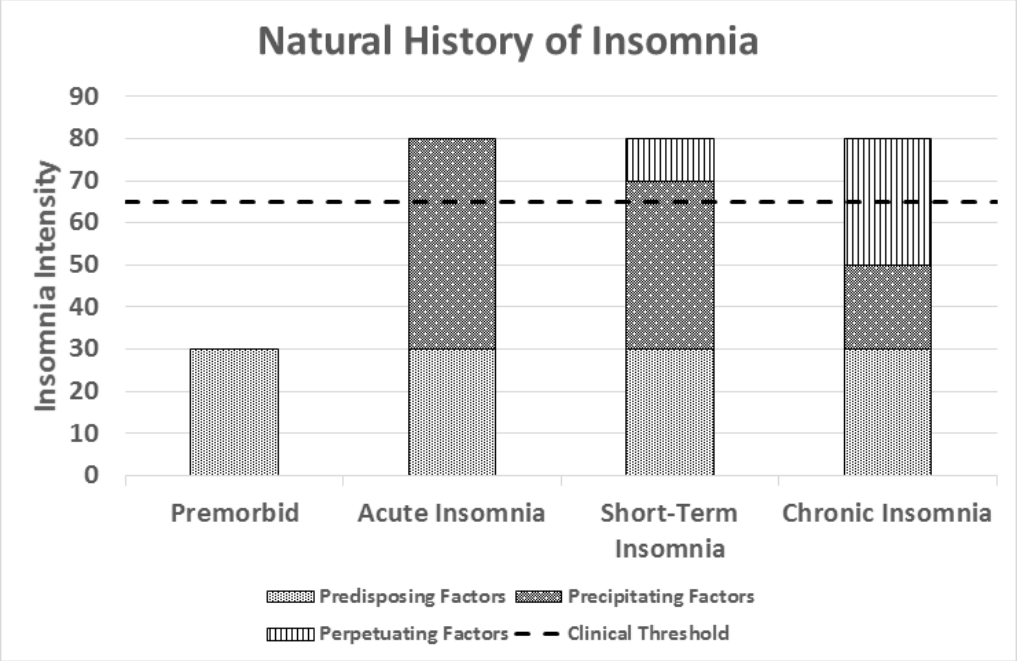

Figure 1. The natural history of insomnia. (Adapted from Spielman & Glovinsky, 1991).

Predominantly behavioural and cognitive- behavioural approaches to treatment have been developed and validated through this model, by the focus on perpetuating factors as clinical indicators. However, the importance of pervasive and dynamic personality factors is arguably undervalued across the insomnia trajectory (e.g. attachment style; Adams, Stoops & Skomro, 2014).

Within Harvey's model (2002), dysfunctional cognitive processes are given a central role in the maintenance of insomnia, particularly with respect to sleep-focused information processing biases (e.g. interpreting signs of fatigue as evidence for severe sleep loss) (see Figure 2). Unsatisfactory sleep is maintained by elevated levels of negative cognitive arousal arising from cognitive distortions, unhelpful beliefs about sleep and maladaptive coping behaviours. A distorted perception of the underlying sleep debt results (i.e. under-estimating hours slept) and individuals consequently underestimate their ability to effectively tolerate distressing symptoms during the day.

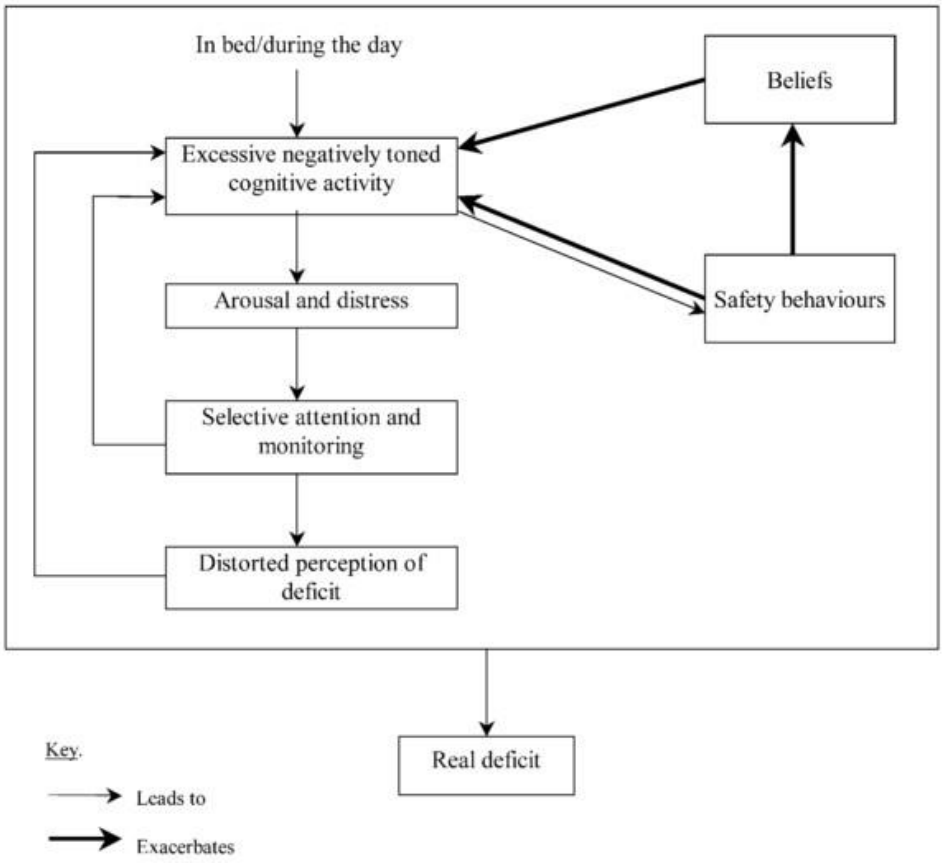

Figure 2. Cognitive model of the maintenance of insomnia (Harvey, 2002).

This model has been very influential in highlighting the fundamental role of nocturnal and diurnal dysfunctional cognitive processes in symptom maintenance. It was, however, developed when the construct of 'primary insomnia' was considered diagnostically valid and interactions with broader and enduring emotional disturbance are under-valued.

Cognitive-behavioural therapy (CBT-I) is the recommended evidence-based treatment for insomnia by NICE (Hofmann, Asnaani, Vonk, Sawyer & Fang, 2012), with effectiveness demonstrated across young adult, adult and older adult populations (Taylor & Pruiksma, 2014) and follow-up benefits not seen with pharmacological treatments (Riemann et al., 2012). The effect size for CBT-I, however, is notably lower than for most other psychological problems (Harvey & Tang, 2002), indicating that it may not be the appropriate treatment of choice for all (Riedel & Lichstein, 2001; Ong, Shapiro & Manber, 2008). Currently, it is unclear which CBT-I components are responsible for change processes, with meta-analyses reporting inconclusive findings due to the diversity in modes of delivery (Cvengros, Crawford, Manber & Ong, 2015).

Some randomised control trials (RCTs) have reported low drop-out rates for CBT-I, between 0% and 8%, although these have involved studies of 'primary insomnia' using rigorous protocols that closely reviewed attendance and actively reduced the chances of attrition (Ong et al., 2008). Two groups for whom CBT-I may be particularly challenging are working individuals without sufficient resources to cope with the effects of stringent programmes of behavioural change and those with comorbid mood difficulties (Spielman, Saskin & Thorpy, 1987). Indeed, significant drop-out rates have been noted in several studies of sleep restriction therapy and stimulus control, demonstrating the challenges inherent with albeit gold-standard, interventions (Vincent, Lewycky & Finnegan, 2008).

Significantly higher drop-out rates have been reported for CBT-I within clinical settings, with two effectiveness studies examining a six-session group CBT-I with non-completion rates of 13.7% and 34.0% (Espie, Inglis, Tessier & Harvey, 2001; Morgan, Thompson, Dixon, Tomeny & Mathers, 2003). Further research is required to improve the acceptability and effectiveness of CBT-I for more complex and nuanced presentations of insomnia.

It is highly problematic for health-care professionals, and unsatisfactory for insomnia sufferers, that there is a significant barrier to the widespread implementation of CBT-I due to a marked lack of trained providers and geographical inequalities in provision of sleep services (Perlis, Jungquist, Smith & Posner, 2008).

Meta-cognitive model of insomnia

More recently, metacognitive treatments including mindfulness and acceptance-based therapies, have been applied successfully to a range of health and mental health conditions, with a focus on emotion regulation and the reduction of ‘second order distress’ (distress that is experienced as the consequence of a primary source of distress) (Goldberg et al., 2017). Meta-cognition is defined as an awareness or knowledge of one’s own cognitive process (Flavell, 1976), or ‘thinking about thinking.’

In relation to insomnia, Ong, Ulmer and Manber (2012) proposed the two-level model of arousal whereby ‘primary arousal’ involves cognitive activity directly related to an inability to sleep and ‘secondary arousal’ is how one relates to these thoughts about sleep (e.g. assigned emotional valence, fusion with thoughts and value given to them). Secondary arousal compounds the negative experience of sleeplessness and/or facilitates increased attention and a

heightened aversive experience of the causes of primary arousal. An example of this is the thought “I will never be able to deliver the presentation tomorrow unless I sleep soon” (primary arousal) which is then compounded by secondary arousal such as believing the thought to be true and seeking bodily cues to confirm this (e.g. tired eyes). This arousal then promotes and maintains insomnia, as shown in Figure 3.

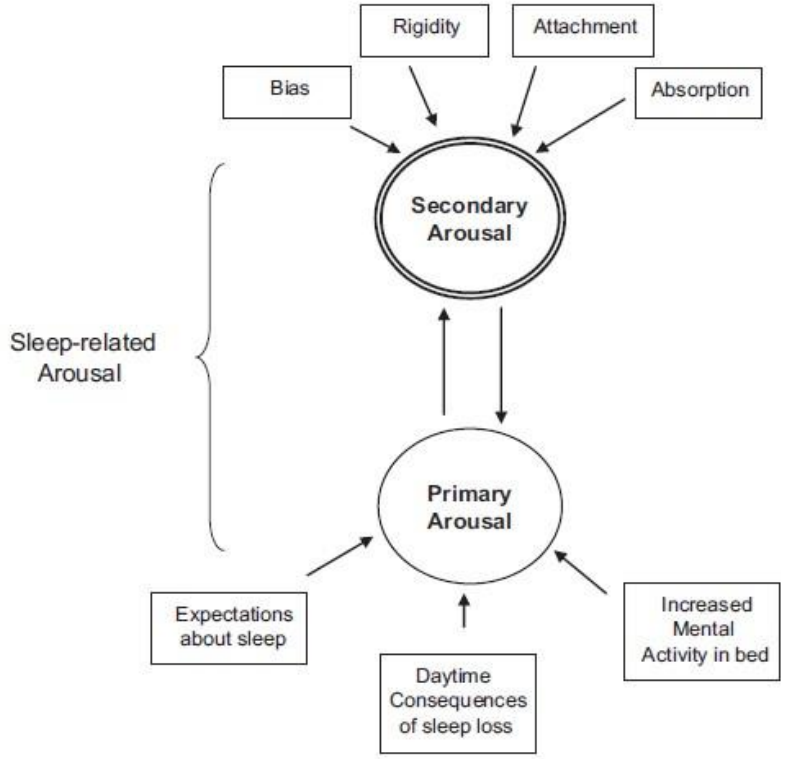

Fig. 3. Two-level model of sleep-related arousal. Primary arousal refers to the cognitive content and activity that is directly related to the inability to sleep. Secondary arousal refers to the attention and emotional bias toward sleep-related thoughts, the degree of attachment one has in believing these thoughts, and the interpretive value of the sleep-related thoughts.

Figure 3. Meta-cognitive model of insomnia, from Ong et al., 2012.

This model and the interventions informed by it are highly compatible with the way in which natural sleep processes are initiated, maintained and ultimately distorted through conscious effort. Sleep is facilitated by cognitive deactivation involving less verbal regulation and control than during the daytime, and more

acceptance of spontaneously occurring physiological and mental processes. Indeed, sleep is not amenable to conscious control and suppression of spontaneously occurring thoughts and feelings only leads to their rebound (Lundh, 2005). People with insomnia often strive to force sleep onset by overregulating spontaneously occurring experiences with verbal input (e.g. verbal rumination) and may habitually overregulate cognitive and emotional processes this way too (Lundh, 2005).

This model is not incompatible with the processes stipulated within Harvey's cognitive model of insomnia maintenance (2002), however, it seeks to clarify that the persistence of elevated arousal in insomnia is the result of an individual's *relationship to* thoughts, rather than a consequence of the thoughts themselves. It also indicates the importance of dispositional factors that may determine an individual's habitual relationship to thoughts and their capacity to decentre from distress (Goodall, Trejnowska & Darling, 2012).

Mindfulness-based stress reduction (MBSR) may teach the skills necessary to deactivate the controlled information processing which dominates at night-time in those with poor sleep. MBSR is a formalised psychoeducational intervention effective for reducing stress and anxiety in those with chronic health conditions and in generally healthy adults (Winbush, Gross & Kreitzer, 2007). Teacher led courses run for 8-weeks in a group format and involve the delivery of education about stress, cognition and health and training in several formal meditation techniques. Participants learn to focus attention on the present moment, breaking anxious and ruminative patterns of thought. Skills are honed within the 150 minutes sessions and practised daily at home to achieve long-term self- management (Winbush et al., 2007).

Mindfulness involves “paying attention in a particular way: on purpose, in the present moment, non-judgementally” (Kabat-Zinn, 1994, p.4) which results in a “decentred relationship to mental contents” (Segal, Williams & Teasdale, 2002, p.41). This process facilitates ‘cognitive defusion’, providing a space for the individual to see thoughts as thoughts and not as reality. The approach of ‘openness’, ‘acceptance’, and ‘allowing’ of spontaneous experiences contrasts with processes of deliberate change in CBT-I, which may inadvertently encourage experiential avoidance.

MBSR potentially provides a trans-diagnostic intervention for insomnia symptoms by working with the ‘total’ presentation of the individual. The facilitated group format may be holistically beneficial and offer a cost-effective, community-based early intervention. Individuals with high distress, dispositional traits for anxiety/avoidance, or those experiencing insomnia in conjunction with low mood may find MBSR a more acceptable approach than CBT-I.

Rationale and aim for systematic review

The current review paper was motivated by an interest in the acceptability and effectiveness of MBSR as a ‘holistic’ treatment for individuals with persistent insomnia symptoms. An improved understanding of the appropriateness and acceptability of MBSR for different insomnia groups (e.g. within community, primary, secondary care) will be a valuable contribution towards an evidence-based treatment algorithm for clinicians and policy makers.

In 2007 a systematic review by Winbush and colleagues reported on the effects of MBSR for sleep disturbance. Only one study within the final seven

reviewed specifically researched a population of poor sleepers; 31 original articles reported on sleep as a secondary variable within disease populations. Since then, there has been a steadily increasing number of research publications into mindfulness specifically for sleep disturbance, including a recently published meta-analysis of randomised control trials (RCTs) by Gong, Ni, Liu, Zhang, Su and colleagues (2016) which reported some encouraging results for treatment effectiveness.

This systematic review was guided by the question “What does empirical evidence tell us about the effectiveness and acceptability of MBSR for insomnia symptoms?” This encompassed the multiple contexts in which relevant research may have been conducted (e.g. across age-ranges and mental health statuses) but focussed on MBSR as the specific meta-cognitive intervention for insomnia symptoms.

Review Method

Protocol

The PRISMA protocol (Moher, Liberati, Tetzlaff, & Altman, 2009) was used to make decisions about inclusion of research articles within the review. This is a gold-standard tool predominantly for quantitative research reviews and includes a 27-item checklist and a four-stage flow diagram. PRISMA aims to clarify the value of work for fellow researchers, policy makers and clinicians. For qualitative studies the Critical Appraisal Skills Programme (CASP), (CASP UK, 2017).

Eligibility criteria

Key issues for consideration in the search strategy were the inclusion/exclusion of: mindfulness interventions other than MBSR (e.g. mindfulness based cognitive therapy; MBCT), format of MBSR (e.g. no. of sessions, delivery method), specific age groups (e.g. adolescence, older-adult) and people with long-term physical illnesses. Given the importance of developing trans-diagnostic and 'holistic' interventions for individuals with complex biopsychosocial explanations for sleep difficulties, the search strategy was as inclusive as was reasonable. Exclusion criteria were also important to ensure that conclusions drawn from the review were meaningful.

Inclusion criteria

Qualitative and quantitative studies published in peer reviewed journals, in English language, were included from the beginning of research records. Experimental studies were sought with prioritisation given to those investigating the eight-week MBSR course as the key intervention. Studies with primary aims to investigate the impact of mindfulness upon sleep, either subjectively and/or objectively, and those including pre- and post-intervention measures of sleep quality or duration were prioritised within selection. Proof of concept, conference proceedings and abstracts of unpublished work were initially included and later scrutinised for added value. Healthy and clinical samples were included with no age limitations. Studies investigating the effectiveness of specific MBSR components within CBT-I protocols were included.

Exclusion criteria

The decision was made to exclude studies with a focus on MBSR as an intervention for chronic physical illness, physiological sleep disorders and substance misuse, due to the homogeneity of these populations and sleep as a secondary variable of interest. In such cases, the primary distress (e.g. pain, medication effects) was likely to directly interfere with sleep processes and adequate 'opportunity' for sleep may be severely compromised. This is a different phenomenon from primary distress associated with ineffective coping and elevated arousal associated with insomnia. Studies involving sleep outcomes from MBCT studies specifically designed for prevention of relapse in depression were also excluded. This was due to the idiosyncrasies of sleep architecture and a tendency for over-sleeping in this population (Zhai, Zhang & Zhang, 2015), which could make the results difficult to consolidate with outcomes from MBSR. Finally, samples actively using hypnotic or other psychiatric medication were excluded due to the potential for significant confounding of the data.

To summarise the criteria underpinning the review question a PICOS (population, interventions, comparisons, outcomes, study design) criteria table was developed, a process endorsed by the Cochrane Collaboration (Higgins & Green, 2013) (see Table 1).

Table 1

PICOS Criteria for Defining Review Criteria

PICOS criteria
Population: Healthy individuals with insomnia symptoms, community samples, clinical populations. Inclusive of gender, ethnicity and age.
Interventions: MBSR specific interventions involving a minimum of 2h weekly practise, delivered across a period of at least four weeks. 45minute home practise stipulated. Traditional eight-week group MBSR courses prioritised, however internet-based interventions and modified interventions acceptable.
Comparison: Studies comparing MBSR and CBT-I prioritised. Studies developing MBSR for insomnia symptoms prioritised (e.g. MBSR versus MBTI). Studies without comparison group included to understand the characteristics and experiences of individuals perceiving sleep benefits from MBSR
Outcomes: Qualitative reports of experiences of MBSR prioritised, e.g. interview or focus group analyses. Pre-post, follow-up, trait/state measures of sleep quality, personality, arousal, anxiety, stress, mindfulness prioritised. Reasons for drop-out explored. Self-report measures of sleep and objective measures of sleep included e.g. polysomnography.
Study design: Qualitative studies prioritised. Studies reporting pre and post data prioritised. Experiential studies with MBSR interventions, RCTs.

Information sources

Web of Science, PsycINFO and PsycARTICLES, and relevant key databases contained within these were selected based on their coverage of journals most relevant to the research area. These were last searched in September 2017. Reference lists of included articles were also searched but no further articles selected for inclusion.

Search

Key words contained within the research question as well as relevant alternative words were searched for. The Boolean search term was: **TITLE:**

(mindfulness OR "mindfulness-based stress reduction" OR MBSR) *AND* **TITLE:** (sleep* OR insomnia) *NOT* **TITLE:** (cancer OR fibromyalgia OR pain OR "sleep apnoea" OR MBCT or "cognitive therapy").

Study selection and data items

Table 2 shows criteria used to evaluate research included with the final systematic review.

Table 2

Study Selection Criteria

Study selection criteria
1. Aim and design of research Provides data helpful to understanding the acceptability and effectiveness of MBSR for insomnia symptoms, design reflects a relevant mindfulness intervention and interval data.
2. Mindfulness intervention Details of the mindfulness intervention used. Broad adherence to MBSR format.
3. Sample Detailed description of sample characteristics, community/clinical data, recruitment
4. Outcome measures Key: state and or trait mindfulness, self-report sleep quality/quantity. Arousal measures, sleep diary measures, objective measurement of sleep.
5. Main findings Summary of key findings in relation to aims of study, inclusive of drop-out rate, compliance, meditation time etc.
6. Evaluation Key strengths and limitations of work summarised.
7. QATQS/ CASP score and priority level for current review (PICOS)

Data collection process

Articles were searched based on the inclusion of search terms within the title and these were then reviewed for duplication across databases. All articles were then screened based on their abstract content and a second-rater reviewed 20% of these to validate the process, 92% agreement; k=.75, p<.007 (see Appendix A, Table 1). Each full-text article was then accessed independently by the researcher for further review and inclusion/exclusion. The second-rater reviewed 20% of articles for final inclusion and quality rating agreement was 100%, k=1.00, p=.014 (See Appendix A, Table 2 for full analysis).

The Quality Assessment tool for Quantitative Studies (QATQS; Effective Public Health Practice Project, 2009) was used to appraise the quality of quantitative articles included in the final selection. This is a widely used tool for knowledge synthesis within systemic reviews and provides an overall article rating of ‘strong,’ ‘moderate’ or ‘weak.’ The Critical Appraisal Skills Programme (CASP; 2017) is a gold-standard tool for appraising the quality of qualitative healthcare research and a score out of 10 was used for reporting.

Awareness of risk for bias that can affect cumulative evidence was maintained (e.g. publication bias), and any themes of under/selective reporting within studies were noted. This was particularly the case for meta-analyses which often report studies that do not include individual participant or aggregate data studies that would otherwise serve to highlight their potential impact on conclusions (Ahmed, Sutton & Riley, 2012).

Results

The initial screening search identified 78 articles in total, which reduced to 66 after duplicate entries across databases were removed. This reduced to 43 after initial abstract screening which removed studies reporting nonexperimental methodology, populations that were highly specific in disease or context (e.g. incarcerated women, hypnotic withdrawal), theoretical papers and letters to editors. After further full text screening using the PICOS criteria, a further 29 studies were removed, most of which used mindfulness interventions that deviated significantly from traditional MBSR. Several studies reported on the incorporation of mindfulness within CBT protocols, however, the majority of these remained heavily behavioural in focus and did not address the specific effects of mindfulness components. Work by Ong and colleagues, however, was included because the programme of mindfulness-based therapy for insomnia (MBTI) prioritises MBSR principles within a framework that upholds the established behavioural interventions for insomnia. Four abstracts excluded reported on data later published and included in the review, six articles/abstracts could not be retrieved. The two meta-analyses were not included in the review because in total only three studies met PICOS criteria and these were already identified for inclusion.

Ten full-text articles were identified for final review including one qualitative study and two predominantly quantitative studies inclusive of qualitative data. Three of these studies were assessed to be of strong quality, five of moderate quality and two of weak quality. Three abstracts were also included within the final review which were presented at renowned sleep conferences and included enough methodological detail to evaluate (tentatively) the value of the research.

These abstracts did not lead to published full-text articles for unknown reasons, nevertheless, incorporating grey research into systematic reviews can be important in counteracting the impact of publication bias, providing a broader evaluation of the state of research in the area (Blackhall & Ker, 2007). Details of the full search process can be found in Figure 4. Table 3 summarises all articles included in the final review.

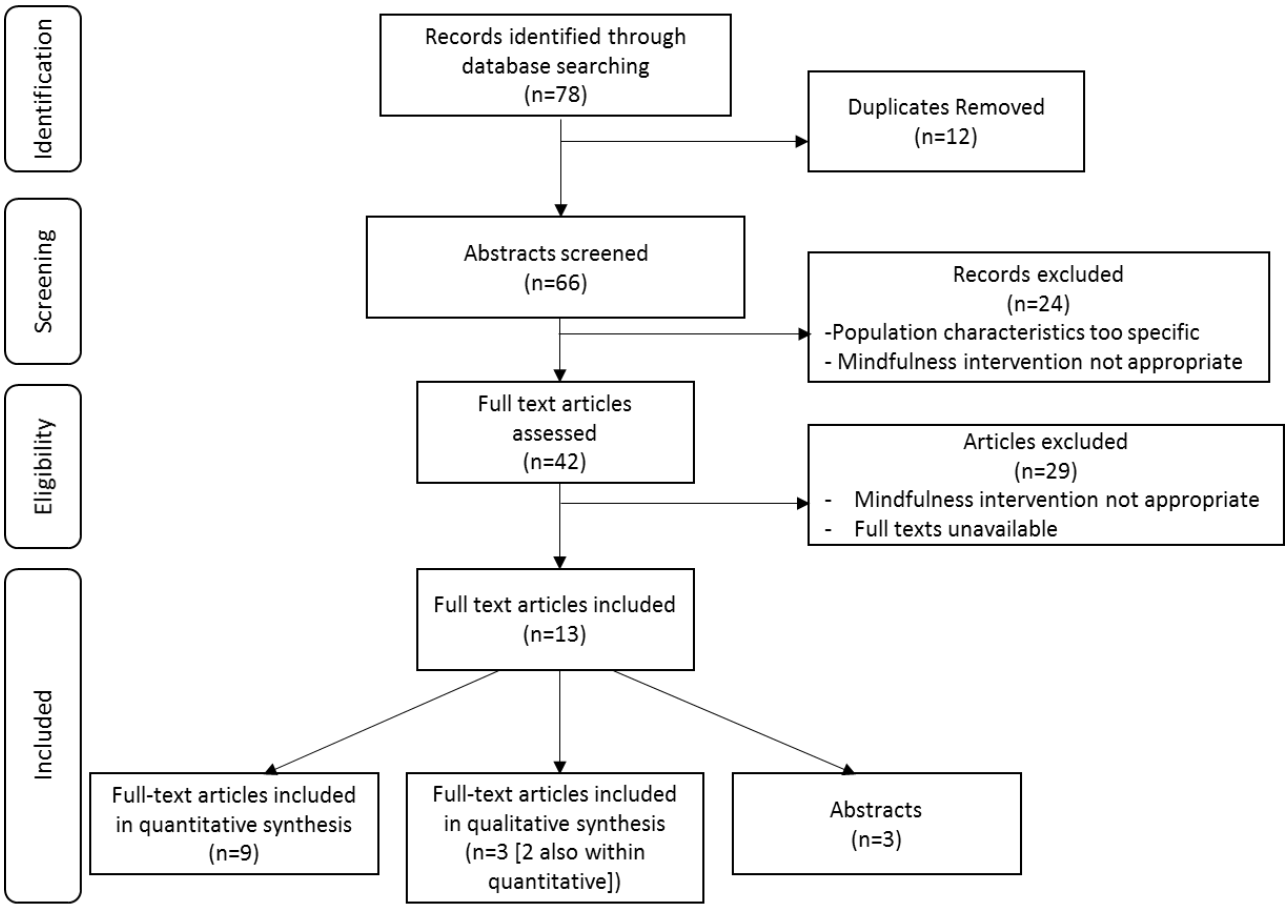

Figure 4. Search process for systematic review

Table 3

Studies Included within Systematic Review

Study (year)	**Aims and design**	**Mindfulness intervention**	**Sample**	**Outcome measures**	**Main findings relating to efficacy and acceptability of MBSR** (incl. effect size, dropout, adherence)	**Evaluation**	**QATQS/ CASP rating**
Querstret, Cropley & Fife-Schaw (2017)	How does an internet based, instructor led mindfulness - based intervention exert positive influence on measures of occupationa l health. Randomise d waitlist control design. 3 & 6m follow-up.	Mental Health Foundation & Wellmind Media developed internet course comprising MBSR and MBCT components. Follows 8-week programmes in condensed 4- week format.	N= 118, M=40.68, 80.5% F. Opportunity sampling, healthy individuals with moderate-high levels of work-related rumination, naïve to mindfulness	WRRQ, PSQI, FFMQ-SF	Sig. lower levels of work related rumination and fatigue, sig. higher levels of SQ compared to controls. Effects maintained at both time points. Acting with awareness fully mediated intervention effects for SQ and affective rumination. **Drop-out:** 3 intervention group, 6 control (no reasons given)	**Strengths:** Evidence specifically for 'acting with awareness' facet of mindfulness in positive outcomes. Highly motivated participants, no group and social effects to compound results **Limitation**s: no comparison with other treatments, no data on amount of meditative practise undertaken, highly motivated participants. Not possible to adequately monitor compliance and assess engagement	**QATQS Strong**

Zhang, Liu, Xie, Zhao, Shan,…& Cui (2015).	To test effectiveness of MBSR for chronic insomnia and combined depressive or anxiety symptoms of older adults. RCT, single blind design, wait-list control group. Pre-post intervention outcomes.	8-week MBSR modified for age group.	N= 60, ≥ 75 yrs, 41.67% F Chronic insomnia as defined by DSM-IV. Self or clinician referred recruitment.	PSQI (SQ, SOL, SDist, SD, SE, daytime dysfunction), SAS, GDS,	Time x group interactions for PSQI and GDS. MBSR group =sig. decrease in global PSQI score (*d*=1.12), PSQI daytime dysfunction (*d*=0.76) compared to control. GDS= sig. decrease in MBSR group (*d*=1.20). **Drop-out**: 1 from MBSR group, no longer interested.	**Strengths:** Evidence for MBSR as an effective in older adults for chronic insomnia. Depressive and anxiety symptoms considered within design. **Limitations:** self-report measures only. Lack of follow-up duration. Limited generalisability to wider population.	**QATQS= Moderate**
Hubbling, Reilly-Spong, Kreitzer & Gross (2014)	Focus groups associated with RCT for the effectiveness s of MBSR for	8 –week MBSR	N=9, 8 F, M age = 47 yrs (range 22-66), DSM-IV diagnosed chronic insomnia.	2 focus groups, 5 months after EOT. 2h. "How was	4 major themes identified Impact of mindfulness training on sleep and motivation for healthy lifestyle Benefit of mindfulness on aspects of life	**Strengths:** First qualitative study to investigate participant experiences of MBSR in relation to sleep **Limitations:** Potential for selection bias for	**CASP = 9/10** Within context of RCT with significant limitations.

	chronic insomnia. Direct content analysis	sleep routine affected by class, during the course what did you do that was different from before, which practices/why, how will you sustain practice, how did the class affect emotions/thoughts, one minute to promote course	beyond sleep Challenges/successes in adopting mindfulness-based practices Importance of group and teacher effects	post-course focus group, moderator effects leading to participant effects to meet aims of study. Methodology leads to direction of data produced in line with study aims. Only two groups.	

				what would be said"			
Cincotta, Gehrman, Gooneratne & Baime (2011)	To examine the effects of MBSR on ore-sleep cognitive arousal and insomnia symptoms. Quasi-experimental with one study arm.	8 weeks programme closely approximating original MBSR.	N=70, M=47 yrs, 54% F, from mindfulness programme. Wide range of problems, incl. physical and mental health.	ISI, PSAS, meditation diaries, sleep diaries, actigraphy	Significantly lower PSAS and ISI at EOT. Longer duration on meditation diaries = decreases in arousal. No objectively measured change to sleep. Reduced cognitive arousal more sig. than somatic arousal for improved sleep.	**Strengths**: heterogeneity of sample enhances generalizability of findings **Limitations:** no control group, demand characteristics.	**QATQS= Weak**
(ABSTRACT) Jermann, Cervena, Cordera, Carlei, Weber… & Bondolfi (2014)	To determine whether mindfulness leads to reduced hyperarousal, a cause of insomnia. Pre and post MBSR design with	8- week MBSR	N= 43, M=47.5 yrs, 77% F	PSAS, DBAS, daily meditation log	DBAS and PSAS (cognitive arousal) showed significant reduction after 2months. No impact of MBSR on pre-sleep somatic arousal. Pre-sleep cognitive arousal sig. associated with amount of meditation practice.	**Strengths:** MBSR positively impacting pre-sleep cognitive arousal **Limitations**: Limited info in abstract form, e,g. sample characteristics, drop-out, compliance, control group data. Meaningful conclusions cannot be drawn on info provided.	

	control group.						
(ABSTRACT) Cervena, Jermann, Cordera, Carlei, Weber … & Bondolfi (2014)	Effectiveness of MBSR in heterogeneous sample of outpatients. Quasi-experimental, pre- and postintervention measures.	8- week MBSR	N= 64, outpatients recruited for 8- week MBSR complaining of insomnia, community- based controls with insomnia	PSQI, ESS, FSS, actigraphy	MBSR group sig. improvement to PSQI global and PSQI SQ scores from pre-post. However, overall the PSQI scores remained elevated and indicative of significant sleep difficulties. No change in actigraphy parameters. **Drop-out:** 18 from MBSR group, 17 from controls.	**Strengths:** heterogeneous sample of outpatients, intervention showed improvement relative to control. **Limitations:** Limited data provided in abstract, high drop-out rate.	
Ong, Manber, Segal, Xia, Shapiro & Wyatt (2014).	To determine efficacy of MBTI and MBSR for chronic insomnia compared with self-monitor control.	8-week MBSR & MBTI	N= 54, M= 42.9yrs, 74.1% F Self-recruited community sample meeting DSM-IV	Self-reported TWT, PSAS, ISI. Objective measurement: actigraphy, polysomnography. Remission	Both MBSR & MBTI led to sig. greater reductions on all self-report measures (baseline-post) vs. self-monitoring. No sig. differences bw MBSR and MBTI. TWT mean reduction from baseline to EOT	**Strengths:** Evidence for MBSR and MBTI as viable treatment options for chronic insomnia as measured by well validated self-report measures, and an objective measurement of	**QATQS= Moderate**

	Small-scale, early stage RCT with 6m follow up.	criteria for chronic insomnia.	and response rates calculated. Treatment credibility (e.g. logicalness, success in reducing symptoms)	= 43.75 mins, from EOT to 6m follow up – 49.63 mins (d>.08). MBTI superior to MBSR from baseline to 6m follow up with largest difference at 3m post EOT. Remission and response rates maintained for MBSR and MBTI from EOT to follow-up with highest rates for MBTI. 3 drop-out prior to MBSR, 1 MBTI. 12/16 MBSR=6+ sessions attended 11/18 MBTI=6+ session attended Majority reason for non-show= unexpected circumstances. No differences in treatment credibility reported. MBSR arm reported overall	TWT. Novel comparison of MBSR to MBTI as treatments for insomnia. **Limitations**: Objective measurements of sleep did not corroborate reported improvement to sleep likely due to small sample size and the need for greater power to detect change. Sample bias; female, self-recruited. No blinding.

					sig. more home practise time indicating dose response.		
Brand, Holsboer-Trachsler, Naranjo & Schmidt (2012)	Impact of long and short-term meditation on HPA SA and sleep. Quasi-experimental, pre and post measures	8-week MBSR	N=20, 9 with long-term meditation experience (M= 264m) from formal meditative centres, 11 novices recruited from MBSR course.	FMI, PSQI, HPA system assessment,	Novices reported lower morning cortisol levels, improved sleep quality overall (from sig sleep problem to no longer sig (d=.40) and increased mindfulness. PSQI unrelated to cortisol measures.	**Strengths:** MBSR improving biomarkers for stress reactivity and for sleep quality. **Limitations**: Incentive for participation (reduced fees) may produce demand characteristics, also participants willing to have cortisol measurement. Small N, no control group.	**QATQS= Moderate**
(ABSTRACT) Peters, Junge Cunnington, Ong & Greenwood (2012)	Effectiveness of MBTI to assess generalisability in diverse sample. Quasi-experiment	6 sessions MTBI, 2h each.	N=30, 21F, M= 47.5 yrs recruited from sleep clinic	ISI, PSQI	Average ISI scores indicated sig, change from moderate insomnia to no longer clinically important symptoms. PSQI overall score sig. reduced	**Strengths:** MBTI may be an effective intervention in a clinical sleep setting. Potentially diverse sample characteristics. **Limitations**: Limited data from abstract,	

	al, measures taken at screening, baseline, EOT, 3m follow up.				indicating improvement to SQ (SE most significant component).	dropout, compliance, practice time. No control group, nor comparison group with MBSR.	
Gross, Kreitzer, Reilly-Spong, Wall, Winbush …& Cramer-Borneman n (2011)	Efficacy of MBSR versus traditional PCT, RCT pilot study. Outcomes measured at pre-randomisat i on, EOT & 5-month follow-up.	8-week MBSR +10-minute sleep hygiene (both conditions).	N=30, 21-65 years (73% F) Community self-referral and clinician referral for diagnosed DSM-IV chronic primary insomnia. (comprehen sive 4 stage assessment)	TST, SOL, WASO, SE, ISI, PSQI, SES, DBAS, Remission/r ecovery calculations .	MBSR =Reduced SOL (8.9mins) with actigraphy. Large sig. improvements to ISI, PSQI, diary measures TST, SOL & SE, *d*=.68. Dose-response relationship observed bw home practice and SQ. Comparable results for PCT. 1 participant in each condition withdrew.	**Strengths:** efficacy of MBSR as viable treatment for chronic insomnia as measured by actigraphy, well-validated sleep scales, sleep diaries and measures of remission and recovery. **Limitations:** Pilot N precludes equivalence bw MBSR and PCT arms, lack of additional control group to reduce influence of non-specific factors. DSM-IV defined insomnia. No blinding.	**QATQS= Weak**

Ong & Sholtes (2010)	Single case illustration with qual. and quant. data to demonstrate effectiveness of optimised MBTI. Pre and post intervention measures.	8-week MBTI (extending Ong et al., 2008 to include all-day mindfulness retreat and further consolidation of mindfulness skills) Clinical psychologist trained in CBT- I and mindfulness and a qualified MBSR instructor.	Chronic, primary insomnia (Structured Clinical Interview for DSM-IV). GAD diagnosis considered 'independent' of insomnia.	Sleep diary parameters, PANAS, PSAS, ISI DBAS GSES KIMS	200 min decrease in TWT, TST almost doubled. Higher sleep quality and almost 50% decrease in pre-sleep arousal. Reduction in maladaptive beliefs/attitudes about sleep, hyperarousal, sleepiness and fatigue. Increased mindfulness.	**Strengths**: Comprehensive methodology. Novel intervention specifically adapted for insomnia symptoms. Improvements reported for each outcome measure. **Limitations**: DSM-IV criteria for insomnia. Unable to draw conclusions as to whether mindfulness or behavioural components led to change. Sleep difficulties remain important. No follow-up data reported despite promising prognosis. Rationale not provided for participant selection.	**(adapted) CASP = 7/10**
Ong, Shapiro & Manber, (2009)	Naturalistic 6 and 12 month follow up from	As Ong, Shapiro & Manber, (2008).	N=21	At 6m and 12m= 1week sleep and meditatio	61% no relapse at 12 month follow up. Most sleep related benefits maintained in terms of symptom	**Strengths**: Demonstrates the retention of sleep benefits following MBTI. Tracked	**QATQS= Moderate**

	2008 study			n diaries, IEQ, ISI, KIMS, PSAS, GSES, PANAS	severity at each time point and course of insomnia symptoms. Higher pre-sleep arousal and sleep effort at completion of intervention constitutes risk for insomnia episode with 12m. Mindfulness skills correlated negatively with DS and improved daytime function reported.	incidence of insomnia in follow-up period. **Limitations:** 39% reported at least one episode of insomnia. Absence of control group, small N, cannot determine which components are related to change. No info. on non-follow ups.	
Ong, Shapiro, & Manber, (2008)	To assess acceptabilit y and feasibility of MBTI and assess outcome variables. Open-trial, pre-post treatment design for treatment developmen	6-week MBTI (mindfulness meditation, sleep restriction, stimulus control, sleep education, and sleep hygiene). 2h weekly sessions.	N=30, 1865 years. Primary psychoph ys iological insomnia (inclusion criteria for insomnia research met; Edinger et al., 2004).	Sleep diary parameters assessed weekly. ISI, KIMS, PSAS, meditation diary, HAS, DBAS, GSES, ITSS Attendance, compliance, helpful	50% of participants experienced at least 50% reduction in TWT. 28 reported non-clinical levels at treatment end. Sig. reductions on ISI, PSAS, GSES, DBAS. More meditation practice related to greater reduction in arousal. No change KIMS, HAS, PANAS. **Drop out**:	**Strengths:** Novel new treatment study methodological rigour and appropriate evaluation of acceptability for participants. Further research can build upon this to progress treatment development appropriately. Suggests importance of	**QATQS= Strong**

	t study (Stage 1 evaluation). Focus group for qualitative feedback.		component s survey.	8 dropped out before starting (5 finding other treatment and 3 citing time constraints). 2 dropped out after qualifying. 3 dropped out before third session (time commitment; lack of interest; no reason). **Attendance**: 18/27= 6 sessions, 7= 5 sessions, 2= 4 sessions. **Treatment satisfaction:** 2 =completely satisfied, 13= v. satisfied, 9=fairly well satisfied, 2= somewhat dissatisfied, 1= v. dissatisfied. **Helpful components:** In order of helpfulness, all at least 'moderately helpful', Cognitive	understanding sleep processes in order to access mindfulness 'cognitively' and thus experientially. **Limitations:** No sig. change in mindfulness skills using KIMS. Dropout before starting interesting. Absence of control group, uncontrolled design, cannot determine which components most effective.

			(e.g. learning about sleep) (M=2.14, sd=.68), mindfulness (M=2.04, sd.78), behavioural (M=2.00, sd=.90). Non-specific and sleep hygiene=lower rating. **Focus group data:** Overall enjoyment, feedback for more meditative exercises, increased guidance for meditation and for explicit connections between sleep and mindfulness through anecdotes and theoretical discussion.

Note: Sleep diary/objective sleep parameters: TST= total sleep time; TWT= total wake time; SOL= sleep onset latency, WASO= wake after sleep onset; SE; sleep efficiency; SQ; sleep quality; SD; sleep duration; SDist; sleep disturbance; DTS= day time sleepiness; DTF= daytime fatigue. RCT; randomised control trial. GAD; generalised anxiety disorder; PSQI; Pittsburgh sleep quality index; PCT=pharmacotherapy; PANAS= positive and negative affect scale; PSAS= pre-sleep arousal scale; ISI= insomnia severity index; DBAS= dysfunctional beliefs about sleep scale; GSES= Glasgow sleep effort scale; KIMS= Kentucky inventory of mindfulness skills; HAS= hyperarousal scale; ITSS= insomnia treatment satisfaction scale; IEQ= insomnia episode questionnaire; SAS; self-rated anxiety scale; GDS; geriatric depression scale; psychophysiological insomnia= primary insomnia with learned/conditioned arousal; EOT= end of treatment; MAAS; Mindfulness attention and awareness sale; REQ= Recovery experience questionnaire; WRRQ= Work related rumination questionnaire; HPA SA; Hypothalamic pituitary axis system activation; FMI= Frieberg mindfulness inventory; FSS=Fatigue Severity Scale

Critical Evaluation

Randomised control trials

Collectively, the four RCTs reported encouraging but preliminary evidence that MBSR courses lead to significant improvement to self-reported sleep quality, total sleep time and insomnia symptoms in healthy and clinical populations and results are maintained at six-month follow-up. There was some corroborating evidence for improvement to objectively measured sleep parameters (Gross et al., 2011).

One study involved a four-week condensed, internet delivered MBSR course with MBCT components (Quertstret et al., 2017), one study compared 8week MBSR with an additional sleep hygiene component to a pharmacological intervention (Gross et al., 2011), one study compared 8-week MBSR with MBTI (Ong et al., 2014) and one study followed 8-week MBSR with adaptations for an older adult population (Zhang et al., 2015). Definitions of insomnia varied across studies with two utilising the DSM-IV concept of ‘primary insomnia’, one study incorporating co-existing mental and health difficulties and one study investigating a healthy population of individuals with high work-related rumination and non-clinical sleep complaints. There was additional variability within the processes of participation selection, monitoring for compliance and sleep measurement. These differences prevent direct comparisons across studies but also suggest the potential versatility and acceptability of MBSR as an intervention across populations.

The results of Ong et al. (2014) are noteworthy as they compared traditional MBSR with MBTI which incorporated behavioural components of

sleep restriction, stimulus control, sleep education and sleep hygiene. MBSR and MBTI were reported have equivalent effectiveness for improving self-reported insomnia symptoms in a clinical population. Total wake time reduced on average by 43.75 minutes between baseline and end of treatment (and by 49.6 minutes at six-month follow-up). At six-month follow-up, larger benefits were maintained within the MBTI group, however, it is unclear which components of MBTI may be associated with superior outcomes and it may be the explicit theoretical and anecdotal links made to sleep that were empowering for participants (Ong et al., 2008).

It is encouraging that a small number of RCTs have revealed positive results for the effectiveness of MBSR for insomnia symptoms, however, these results should be interpreted with caution. A high level of control is necessary for the design of these studies and negates the generalisability of findings to MBSR as delivered within clinical services or the community where adherence to protocol is less stringently monitored and there may be issues of drop-out and compliance that are minimised in RCTs. Furthermore, the studies investigating clinical symptoms of insomnia did not involve complex presentations, but predominantly ‘primary insomnia’ where symptoms may be most neatly explained by sleep-focussed cognitive and behavioural processes. For these cases, MBTI may well be an effective adaptation to MBSR, however, it is unknown whether this is true for cases where insomnia coexists with health and mental health distress where more general, pathological emotion processing dysfunction may be maintaining sleep disturbance (Ong et al., 2014).

Quasi-experimental studies

The studies which utilised more heterogeneous samples supported the wider acceptability of the intervention across populations. In two well-powered studies of professionals experiencing work-related rumination, MBSR in a condensed form led to improved sleep. Querstret and colleagues (2017) reported that ‘acting with awareness’ fully mediated intervention effects for sleep quality and rumination in healthy individuals. This was the only study to explicitly demonstrate which aspect of mindfulness was associated with changes to sleep.

There is initial evidence indicating that low-dose MBSR is helpful for sleep in working age individuals susceptible to work-related stress and increased cognitive arousal. MBSR may be a helpful, preventative intervention for the development of more persistent sleep difficulties in such vulnerable groups. It is possible that internet and home-based MBSR interventions may be acceptable for healthy individuals experiencing stress-related poor sleep and the social/group component of MBSR may be less important.

Within clinical populations, the work of Ong and colleagues (2008; 2009; 2010) (which preceded the 2014 RCT), demonstrated overall total wake time as reduced by at least 50%, total sleep time improved by 50%, and pre-sleep arousal reduced by 50%. Furthermore, there was a reduction in maladaptive beliefs and attitudes about sleep, hyperarousal, sleepiness and fatigue. Ninety three percent of individuals with primary insomnia reported remission from a clinical complaint and 50% reported being very satisfied or completed satisfied with the treatment intervention. At 12-month follow-up 61% reported no relapse

of symptoms and risk factors were identified as higher pre-sleep arousal and sleep effort at end of intervention.

Importantly, the focus group associated with this study ranked the 'moderately' helpful components of the course similarly, where cognitive aspects were most valuable (e.g. learning about sleep processes), followed by mindfulness skills and then behavioural strategies. Sleep hygiene was not reported to be a helpful component of the course for this group. Participants also provided feedback that explicit connections between sleep and mindfulness (e.g. through anecdotal and theoretical discussion) would improve the acceptability of the course, in addition to increased guidance for meditation and more meditative exercises.

The importance of integrating sleep-specific cognitive components within MBSR was supported by Cincotta and colleagues (2011) who reported that decreased cognitive arousal was more important than somatic arousal for improving sleep in individuals with insomnia coexistent with other health and mental health problems. This finding was also reported in the abstract by Jermann et al (2014), who also recruited a heterogeneous sample of outpatients. Two further abstracts supported the acceptability of MBSR and MBTI for insomnia in diverse outpatient groups.

Qualitative data

The single-case qualitative data discussed in Ong and Sholtes (2010) described positive changes to sleep processes as attributable to the authentic experience of learning to allow thoughts to be without trying to clear the mind.

For this participant, the ‘breakthrough’ happened at week six following a reflective discussion facilitated by the therapist regarding the persistence of intrusive thoughts at night-time despite mindfulness practise. This illustrates the potential importance of the therapist/course facilitator in helping participants to make sense of their experiences with mindfulness and the relationship to their sleep. It is possible that such guided self-discovery is protective against participant drop-out and that in-session formulation of resistance/barriers is enabling of change processes. It is possible that the expertise of the course facilitator in formulating psychological defences and resistance in the context of sleep may be an important variable predictive of continued engagement and improvement to sleep.

Hubbling and colleagues (2014) provided a valuable summary of four major themes from focus groups associated with the MBSR RCT for chronic insomnia: impact of mindfulness training on sleep and motivation for healthy lifestyle, benefits of mindfulness for life beyond sleep, challenges/successes in adopting mindfulness and importance of group and teacher effects. Results highlighted that improvement to both sleep-specific distress and more general emotional dysregulation was associated with overall sleep quality. Although the study provides important insights into the acceptability of MBSR for clinical insomnia, this work is interpreted in the context of data having been derived from directive and potentially leading interview questions and the likelihood of participant effects serving to confirm the aims of the study.

Acceptability of MBSR programmes

Many of the studies reviewed reported the hours of home practise and compliance to the recommendations of the programme as strongly and

positively associated with sleep quality. Additionally, Brand and colleagues (2012) provided novel evidence for MBSR improving biomarkers for stress reactivity and sleep quality in novices and how these variables were significantly lower in experienced meditators. There was limited exploration, however, of the variables underlying commitment and motivation to the MBSR process such as nature of sleep difficulty and mental health presentation. Studies did not attempt to unpick the factors underlying variance in home practise and generally there was limited analysis of drop-out and withdrawal rates which is valuable information for understanding the acceptability of the intervention.

In Ong et al. (2014), there was 28% dropout before starting MBSR, with reasons given of time constraints and alternative treatment preferred. A further five dropped out within the first three weeks due to time commitments and lack of interest in the approach. Given the reliably reported ‘dose response’ effect of mindfulness practice, this is an important area to understand more thoroughly in order to maximise beneficial outcomes.

Course compliance was infrequently detailed, however, the RCT by Ong and colleagues (2014) reported that 75% of participants attended six out of eight weekly sessions (Ong et al., 2008; 66%). An area that was neglected consistently but is likely to significantly impact the acceptability and effectiveness off MBSR is course facilitator effects (Ong & Sholtes, 2010).

Bias and limitations

Beyond the bias and limitations of individual studies discussed above, there were common biases inherent in the methodology including female dominant samples, motivated participants enrolled in the MBSR (for which they

pay fees), demand characteristics due to a lack blinding and a lack of reporting regarding the experiences of those who withdraw/drop out.

There was a large variation of sleep measures used and a high level of inconsistency in the reporting of sub-scales and key indices of gold-standard self-report measures This selective reporting negates comparison between studies of the nature of change to sleep and prevents conclusions being drawn as to the components of sleep most reliably associated with MBSR interventions. This information is particularly important to understand whether MBSR is affecting secondary and/or primary arousal systems.

Discussion and Conclusion

The results show the infancy of research into the acceptability and effectiveness of MBSR as an intervention for insomnia symptoms. Overall, the studies reviewed were of good quality (three strong, five moderate, two weak) and collectively provide preliminary evidence that MBSR involves positive outcomes for overall sleep quality and satisfaction that are maintained at follow-up. Specifically, improvements were reported to cognitive hyperarousal, total wake time, total sleep duration, sleep efficiency and cognitive distress associated with the daytime impact of insomnia. As insomnia is a self-reported condition, such perceived improvements to sleep are central to relief of distress. There was some evidence for objective improvements to sleep, however, most studies did not assess this and findings were inconsistent. Discrepancies between objective and self-reported sleep are common and this effect may be more pronounced in more complex cases (Fernandez-Mendoza et al., 2011). It is also possible that self-reported change to insomnia symptoms precedes objective change, which may happen more gradually over time.

Popular behavioural models continue to emphasise the relevance of sleep hygiene and maladaptive coping strategies to insomnia maintenance in 'primary insomnia.' The current review indicates that participants regard psychoeducational components (about sleep processes) and cognitive components of MBTI as just as important, if not more so than traditional behavioural interventions for reducing arousal in those with long-term insomnia (e.g. Ong et al., 2008; Cincotta et al., 2011). The qualitative studies also indicate the challenges of compatibility between CBT-I and mindfulness-based approaches to insomnia, which is worthy of further research attention (e.g. single case illustration by Ong & Sholtes, 2010). Theoretical contradictions may be experientially problematic, (reducing treatment acceptability), and it is unclear whether the two approaches are most effective combined coherently or as theoretically distinct interventions.

Recent meta-cognitive models of insomnia maintenance have postulated that 'secondary arousal' associated with dysfunctional cognitive processes around sleeplessness should be the primary target for intervention (Ong et al., 2012). The current review indicates that MBSR may be beneficial to sleep by relieving secondary, cognitive arousal associated with insomnia but also arousal associated with more general emotional dysregulation (e.g. Hubbling et al., 2014; Brand et al., 2012). It is possible that through reductions within both primary and secondary arousal systems, sleep processes are impacted directly, at a physiological level (leading to both subjective and objective improvements to sleep) although such a hypothesis is yet to be explored.

Improved sleep may be (partially) mediated by lower stress reactivity which could be associated with greater acceptance of experience, acting with

awareness, or another facet of mindfulness (e.g. Brand et al., 2012). This review highlighted an absence of linkage between findings reported and facets of mindfulness associated with change processes. Future treatment research should endeavour to make meaningful links between theory and outcomes to support the evolving understanding of how MBSR is effective for improving sleep.

Since the review by Winbush et al. (2007) which included sleep as an outcome variable within a range of disease populations, there have been several controlled RCTs with insomnia as the key outcome variable. The current review summarises this research to demonstrate the growing, corroborating evidence that MBSR practice is positively associated with improved sleep and a decrease in cognitive sleep-interfering processes. This is consistent with the meta-analysis by Gong et al. (2015), which reported that mindfulness-based interventions (of mixed format) show preliminary and promising clinical benefits for mixed insomnia disorder presentations, as measured objectively and subjectively (despite the mixed methodologies of studies in this area).

There are several implications of the current review for clinical practice, which are likely to improve the acceptability of MBSR as an intervention for insomnia. In this review, the importance of sleep psychoeducation and of insight into cognitive processes involved in insomnia have been revealed as particularly important for symptom relief. Improved knowledge about sleep may increase motivation and empower individuals to make different choices, support course engagement and promote home practice, and ultimately increase hopefulness for positive change. Health professionals, therefore, should offer more than sleep hygiene as psychoeducation and a focus on cognitive

processes within MBSR may even be prioritised above the more traditional behavioural interventions for insomnia. To improve the face validity of an MBSR intervention specifically for insomnia, clinicians should seek to make coherent the questionably contrasting theoretical approaches of CBT-I and acceptance-based approaches. Formulations should indicate the extent to which MBSR should be used in collaboration with more challenging behavioural protocols. Health professionals, therefore, are required to have adequate knowledge of models and treatment approaches for insomnia and of sleep processes. Training needs should be identified and met accordingly.

This review has highlighted the need to establish and advance the acceptability and effectiveness of MBSR for insomnia to provide early, effective and accessible interventions that are inclusive of complexity and can be delivered in a variety of settings. Consistent with the philosophy of MBSR as a holistic intervention, research should seek to understand the personal, diverse and unique experiences of insomnia sufferers undertaking MBSR in order to better understand the psychosocial influences that impact experience of treatment. Specifically, it will be valuable to understand how MBSR is experienced by those in the community who may have co-occuring health and mental health factors which may complicate the acceptability of the intervention. The limited qualitative research in this review provides insights into these areas, however, studies have largely been limited to RCTs and have utilised only structured focus group and single-case designs to date.

There are limitations to the methodology used in this review including the specific search criteria that were chosen to enable initial conclusions about the acceptability and effectiveness of MBSR for sleep difficulties. There was a focus

on psychophysiological insomnia where arousal processes are emphasised in both healthy and clinical groups, however, by broadening the criteria to be fully inclusive of physical health status and specific population groups there may be additional, clinically important factors that have implications for mindfulness as an intervention. There were papers initially identified as relevant to the review but were unsuccessfully sourced and grey literature was included which should be interpreted with caution.

Together, the current review and those which preceded it, support the proposal that MBSR may offer an effective trans-diagnostic and holistic intervention for insomnia, irrespective of presenting complexity. There is encouraging preliminary evidence to support the effectiveness of acceptance-based interventions for insomnia, informed by meta-cognitive models (Ong et al., 2012). Further research is required to understand the determining factors for the effectiveness and acceptability of MBSR across healthy, sub-clinical and clinical populations.

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Appendices

Appendix A

Table 1

Inter-rater Reliability at First Stage of Screening

Study authors	Rater 1 (researcher)	Rater 2 (peer reviewer)	Decision
Brisbon & Lachman (2017)	No MBSR intervention, trait measures, correlational design.	Agreement	EXCLUSION
Kemper, Mo & Khayat (2016)	No MBSR intervention, trait measures, correlational design.	Agreement	EXCLUSION
Blake, Waloszek, Schwartz, Raniti, Simmons… & Allen (2016).	Predominantly CBT as intervention with multi-components including mindfulness and motivational interviewing	Agreement	EXCLUSION
Visser, Hirsch, Jameson, Brown, Ryan & Moynihan (2015)	No MBSR intervention, trait measures, correlational design.	Agreement	EXCLUSION
Caldwell, Harrison, Adams, Quin & Greeson (2010)	Movement-based 'mindfulness' only as intervention (Pilates, Taiji quan, or GYROKINESI)	Agreement	EXCLUSION
Howell, Digdon, Buro & Sheptycki (2008)	No MBSR intervention, trait measures, correlational design.	Agreement	EXCLUSION
Rau, Cribbet, Vaux & Williams (2013)	No MBSR intervention, trait measures, correlational design	Agreement	EXCLUSION
Ferrarelli, Smith, Dentico, Riedner, Zennig… & Tononi (2013)	No MBSR intervention, correlation design.	Agreement	EXCLUSION
Ong, Manber, Segal, Xia, Sharipo & Wyatt (2014)	PICOS criteria met from abstract	Agreement	INCLUSION

Brand, Holsboer-Trachsler, Naranjo & Schmidt (2012)	PICOS criteria met from abstract	Agreement	INCLUSION
Britton, Fridel, Payne & Bootzin (2005)	Abstract for later published study (involving mindfulness based cognitive therapy)	Agreement	EXCLUSION
Crain, Schonert-Reichl & Roeser (2017)	Some PICOS criteria met, need for further review	Non-agreement based on available info, need for further review	INCLUSION
Britton, Willoughby, Bootzin, Cousins, Hasler… & Sharipo (2010)	Although assessment of mindfulness intervention specifically within CBT programme, this was within a substance misuse study.	Agreement	EXCLUSION

Table 2

Inter-rater Reliability for Final Inclusion Stage of Review

		Cincotta et al., 2011	**Querstret et al., 2017**	**Ong et al., 2009**
		Rater 1/2	Rater 1/2	Rater 1/2
QATQS	**Component**			
	Selection bias	3/3	1/1	2/2
	Study design	2/2	1/1	2/2
	Confounders	2/2	1/1	2/1
	Blinding	2/2	2/2	3/3
	Data collection method	1/1	1/1	1/1
	Withdrawal and drop-outs	3/3	2/2	2/2
	Intervention integrity	(80-100%) received intervention Consistency of intervention measured Likely that unintended intervention may influence results	(60-79%) received intervention Some measurement of intervention consistency Likely that contamination/co-intervention influenced results	(80-100%) received intervention Consistency of intervention measured Likely that unintended intervention may influence results

	Analysis	Community allocation and analysis Statistical method appropriate for study design Intention-to-treat analysis performed	Organisational/institutional allocation Statistical methods appropriate for design Intention-to-treat analysis performed	Community allocation and analysis Statistical method appropriate for study design Intention-to-treat analysis not performed
	Global ratings	**3/3**	**1/1**	**2/2**
Decision		**INCLUSION**	**INCLUSION**	**INCLUSION**

Note: QATQS scores; 1= strong, 2= moderate, 3= weak.

SCHOOL OF PSYCHOLOGY

DOCTORATE IN CLINICAL PSYCHOLOGY

EMPIRICAL PAPER

Exploring the Acceptability of Mindfulness-based Stress Reduction as a Community Intervention for Insomnia Symptoms

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Abstract

Objective: There is an urgent need to improve the availability and acceptability of interventions for insomnia. Low-levels of help-seeking and high levels of functional impairment are often characteristic of individuals with unremitting complaints. Ambivalence about the significance of insomnia and/or a helpless resignation can be further compounded by lack of available treatments and socio-cultural attitudes towards sleep. Insomnia is often complicated with coexisting mental and physical health problems, a syndromal presentation. Theoretical and empirical evidence suggests that eight-week, mindfulness-based stress reduction (MBSR) programmes may offer a holistic intervention to relieve emotional disturbance that may underlie the complaint. This research sought to understand the experience of MBSR for individuals in the community with persistent insomnia, to gain insight into its acceptability.

Methods: Holloway and Jefferson's psychosocial method was used which posits the 'defended subject' as key to data construction and analysis (2013). Defences, free associations, researcher-interviewee dynamic, textual information, cultural and sociological knowledge all contributed to an understanding of the 'whole' of the experience of interviewees as communicated within Free Association Narrative Interviewing.

Results: Results indicate that for highly defended individuals with insomnia, MBSR can be a challenging intervention to engage with and to embody. Barriers to acceptability included: limited insight into emotional distress, (unconscious) relational secondary gains to insomnia, limited understanding of sleep as a physiological process, restricted understanding or misconceptions about mindfulness prior to participation, resistance to acknowledging insomnia

as a mental health complaint and practical issues of delivery. Researcher-interviewee dynamics suggested unmet relational needs of many interviewees. An exceptional case is discussed where relational distress was not understood to underlie insomnia and where significant benefits to sleep were reported from MBSR.

Conclusion: The methodology enabled novel insights into the challenges of undertaking MBSR when psychological defenses are strong and insomnia is chronic and complex. By contrast, it is possible that for less complex, acute and recurrent insomnia, MBSR is more readily acceptable. Study limitations, future research needs and recommendations for improving the acceptability of MBSR for complex cases of insomnia are discussed.

Introduction

Approximately one third of the general population experience insomnia symptoms and for at least 10% this is a highly persistent complaint, interacting with life events and perceived stress across the life-span (Adams, Stoops & Skomro, 2014). In the Diagnostic and Statistical Manual of Mental Disorders (5th ed; American Psychiatric Association, 2013), insomnia disorder involves dissatisfaction with quality and/or quantity of sleep (difficulty initiating sleep, maintaining sleep and/or early morning awakenings), causing distress or impairment in functioning (e.g. to emotional wellbeing, occupational performance). Insomnia occurs at least three times a week for three months (despite adequate opportunity for sleep) and cannot be better accounted for by other physical, mental or sleep-wake disorders, substance misuse or medication effects.

Only a minority of those with insomnia symptoms seek-help for the complaint, which often becomes syndromal with other mental health and physical health distress (Leger & Poursain, 2005). There are significant barriers to treatment including the under-resourcing of psychological therapies, inconsistent referral pathways and high costs of specialist care (Cheung, Bartlett, Armour, Glozier & Saini, 2014). Such factors have reinforced a tendency to dismiss insomnia as a mental health issue, placing the onus back on the individual to solve their distress (Kyle, Morgan & Espie, 2010). This can compound sleeplessness through counter-productive effort and intention to control sleep (Espie, Broomfield, Machmahon, Macphee & Taylor, 2006).

Cognitive behavioural-therapy for insomnia (CBT-I) is the evidence-based treatment for insomnia and focusses on the modification of unhelpful

thoughts and behaviour which play a maintaining role in distress (Harvey, 2002). Within randomised control trials, CBT-I has demonstrated effectiveness for the treatment of 'primary insomnia,' in the absence of co-occurring mental and physical health conditions (Okajima, Komada & Inoue, 2011). However, it is unclear how effective and acceptable CBT-I is for more complex cases clinical cases and for sub-clinical, persistent and situational stress-related insomnia in the general population (Harvey et al., 2014).

CBT-I has lower efficacy than for most other psychological disorders and can lead to an escalation in distress and drop-out, particularly in clinical samples (13.7% -34% dropout; Espie, Inglis, Tessier & Harvey, 2001; Morgan, Thompson, Dixon, Tomeny & Mathers, 2003). In addition, traditional CBT-I is unavailable to the majority of sufferers and the evidence-base for its digitalised programme is in its infancy (Haynes, Talbert, Fox & Close, 2018). There is an urgent need for the development of evidence-based, cost-effective and early interventions for insomnia that can be accessed in the community and are appropriate for the often syndromal nature of the complaint.

Mindfulness-based stress reduction as an intervention for insomnia symptoms

There has been growing interest in the group-based, eight-week mindfulness- based stress-reduction (MBSR) programme as a candidate intervention for insomnia. Mindfulness has been defined as a state of attentiveness to the present moment that is unmediated by the cognitive processes which commentate or categorise experiences and events (Brown, Ryan, & Creswell, 2007). With practise, individuals become increasingly aware of, accepting and non-judgemental towards their spontaneous emotional experiences as well as more conscious thoughts and urges. Mindfulness

programmes are now widely accessible through health services and have been shown to improve psychological well-being in mentally healthy, stressed and clinical populations (see review by Baer, 2003).

Ong, Ulmer and Manber (2012) provided a theoretical rationale for the appropriateness of acceptance-based interventions such as mindfulness for insomnia, through a two-level model of arousal. ‘Primary arousal’ involves cognitive activity directly related to an inability to sleep and ‘secondary arousal’ is how one relates to these thoughts (e.g. assigned emotional valence, fusion with thoughts and value given to them). Secondary arousal compounds the negative experience of sleeplessness and/or facilitates increased attention and a heightened aversive experience of the causes of primary arousal. As sleep is facilitated by cognitive de-activation and acceptance of spontaneously occurring physiological and mental processes, secondary arousal overrides natural sleep processes which are not amenable to conscious attempts at initiation (Lundh, 2005).

Mindfulness has been associated with lower stress-reactivity, less need for psychological defences against threat to self, better mental and physical health, improved behavioural self-regulation, greater relationship satisfaction and more helpful responses to relational conflict (Ryan, Brown & Creswell, 2007). Increased mindfulness skill is likely to be highly beneficial for chronic insomnia sufferers with dispositional traits of depression, social introversion, repression and lower ego strength, and behavioural characteristics of higher neuroticism, tendency for rumination, suppression of negative emotional content (internalisation) and a reduced ability to cope (Singareddy et al., 2012).

Through working with the ‘total’ presentation of the individual with insomnia, in a facilitated MBSR group, there may be holistic benefits to emotional well-being and thus to sleep. There may also be additional sleep-specific benefits through the direct application of skills learned. Recent meta-analyses in this area have provided initial support for MBSR as an effective intervention for those with ‘primary insomnia,’ however it is currently unclear how appropriate MBSR is for the wide ranging and often complex presentations of insomnia found in the community (e.g. Querstret, Cropley & Fife-Schaw, 2017).

Aim of the study

The aim of this study was to gain a rich understanding of how individuals with insomnia symptoms experience the MBSR course, to determine its acceptability as an intervention for insomnia. Dispositional and enduring traits were considered in relation to the maintenance of insomnia and difficulties in help-seeking. To achieve an understanding of internal realities within a broader psychosocial analysis, a Free Association Narrative Interviewing method was used (FANI; Holloway & Jefferson, 2013). Unconscious motivations behind narrative processes are interpreted within a holistic understanding of the experience of the interviewee, assuming their position as a ‘defended subject’ where defences are protective against underlying anxiety. The FANI method is compatible with the biopsychosocial nature of insomnia where interacting intrapsychic, inter-personal, social and biological processes are implicated (Spielman & Glovinsky, 1991).

The questions formulated to guide the prioritisation of data for analysis were: how do interviewees describe their experiences of sleeplessness before,

during and after the MBSR course? How do interviewees tell us about their experience of mindfulness and their capacity to engage with and embody this practice? Who is most likely to find sleep benefit from MSBR and (how) do dominant defences impact on change processes?

Method

Design

Holloway and Jefferson's psychosocial method is an adapted form of biographical-interpretative analysis (Wengraf, 2001) where underlying motivations of 'the defended subject' are revealed through interpretations which are made through microanalyses of transcripts and 'free associations.' This approach is consistent with the concept of Gestalt, where the whole is greater than the sum of the parts: parts can only be understood within the total of the contextual framework available (e.g. culture, narrative, sentence) (Rosenthal, 1990). Through a broad analysis of textual information, shared cultural assumptions of the interviewee and researcher and sociological knowledge, a psychosocial understanding of the subject is facilitated. This process does not involve striving for rationality, coherence or consistency (Holloway & Jefferson, 2013).

Participants

Interviewees were eight self-selected, self-reported "poor sleepers" (three male) enrolled on eight-week MBSR courses between September and January 2016 and April and November 2017. Participants completed the Insomnia Severity Index (ISI; Morin,1993) and the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman & Kupfer, 1989) as screening

measures to confirm criteria for ‘poor sleepers’ and at least sub-clinical levels of insomnia symptoms. These are gold-standard, psychometrically valid and reliable questionnaires which together provide comprehensive information about sleep quality and quantity and the severity of the complaint related to psychological distress over the past month (Bastien, Vallieres, & Morin, 2000; Mollayeva et al., 2016). These measures were completed again at follow-up by four of the participants (see Appendix A for results of these measures).

Two interviewees were recruited from one mindfulness centre and six from the other. A further three individuals initially returned consent forms but withdrew before the interview process. Two did not respond to further correspondence and one provided a reason that their GP had advised against participation due to hypnotic use (although this was not an exclusion criterion for the study).

To overcome a key limitation of previous work in this area I did not apply strict exclusion criteria (e.g. based on physical and mental health status), however, the screening process (in the participant recruitment protocol) ensured that psychological factors were a predominant reason for insomnia.

Two interviewees were aged between 20-30 years, the remainder were aged between 47 and 60. Six interviewees were in regular employment, one had recently ended their role and was looking to set up an independent practice, and one lived with family and was ‘in-between’ work. All participants completed at least 70% of the MBSR course.

Constraints of time and resources initially limited participant recruitment, however, this continued until there were repeated links across transcriptions

and a diversity of individual experiences necessary to be able to meet the research aims (Baker & Edwards, 2012).

Procedure

The field collaborators were qualified MBSR teachers (one female) from two community-based mindfulness centres in the UK and both courses followed the traditional 8-week MBSR format. The study was advertised within introductory course material requesting poor sleepers to express their interest in participation to the course leader. Contact details were then passed on to the researcher, at which point potential interviewees were emailed an information sheet, consent form and both screening questionnaires.

In return for participation, interviewees were provided with the opportunity to discuss sleep difficulties after the course with the aim to provide supportive guidance, resources (e.g. on night-time routine, sleep hygiene), and appropriate signposting for further help. Retrospectively, ten-pound Amazon vouchers were also gifted.

Two phone interviews were conducted per interviewee, one early on in the MBSR course (between weeks one and two) and a follow-up interview one to two weeks post course completion. Interviewees were encouraged to keep notes on any observations about their sleep during the eight weeks to assist with recall of material at post-interview. Interviews lasted approximately 20 minutes and were recorded using an Olympus digital recorder. At the end of each interview, the file was uploaded via a universal serial bus to the password protected research laptop. Following transcription, where identifying information was removed and pseudonyms created, the original data files were destroyed.

Identifying information from questionnaire measures was also removed and a unique coding system was used to link these data sources together with consent forms.

FANI

Using the FANI approach, interviewees are encouraged to structure their own narratives and to preserve their account as a whole (see Appendix B for principles of FANI approach). Attention is paid to the process of story-telling and sense making, noticing narrative features such as contradictions, inconsistences, hesitancies and changes to emotional tone. The remembering process is considered “a continual tension between a truthful acknowledgement of the emotional reality of a past event and defensive distortions in the service of psychological protection.” (Holloway & Jefferson, 2013).

By embodying a curious and open stance, e.g. “Can you tell me about…” the aim is to facilitate an expression of these unconscious intersubjective dynamics in the interview. The interviewer is considered to co-create an understanding of the account being told, such that the analytical outcome is one of ‘co-production,’ produced inter-subjectively. The interview process is intended to be both containing and cathartic, however, the position of ‘researcher’ is maintained in that the interpretation process is predominantly saved for outside of the interview process. After piloting several versions of a semi-structured interview, a final version was used as a guide for interviews which can be found in Appendix B. Transcription was guided by the recommendations of Jefferson, as cited in Hutchby and Woofitt, (2002), where relevant features of prose are represented, e.g. pauses, emphasis, inflections (See Appendix D).

Data analysis

A pro-forma, pen-portrait, and a reflexive journal were used to structure the 'whole' of each case (from the researcher perspective) for analysis. The pro-forma summarised biographical data, comments on themes and ideas that emerged through the reading process. This was informed by reflective notes (e.g. thoughts, questions, confusions, contradictions and visceral responses), which provided a way of accruing detail and contributing to researcher reflexivity.

The pen-portrait was created to enable the person to come alive for the researcher and supervisor/peer reviewer, providing enough information for checking the fit of interpretations within and across pre-post interviews. This resource was largely descriptive and provided enough information for the research team to recall the case and its complexity, to consider the validity of interpretations and any areas for further consideration/exploration with the interviewee. This analytical approach closely followed that of Holloway and Jefferson, however, Spielman and Glovinsky's biopsychosocial model of insomnia (1991) was also incorporated within the analysis, to consider data with a sound theoretical framework for insomnia. Appendix E shows how these processes came together within the biopsychosocial framework for insomnia to shape the 'whole' of the experience being conveyed.

The analysis was guided by the principle that "if an interpretation 'works' the ripples reverberate through the rest of the analysis" (Holloway & Jefferson, 2013, p.6). To strengthen the credibility of the interpretations made, each transcript was read by a DClinPsy peer and a reflective discussion was had where multiple hypotheses about the data were considered. These hypotheses

were further explored with a secondary supervisor: a psychoanalytical psychotherapist and lecturer in qualitative data analysis. A particularly challenging data set was taken to a qualitative teaching workshop where specific feedback was sought on the analysis process from multiple peers. An awareness of the impact of researcher background, beliefs and biases upon the interview process was maintained by utilising all the resources discussed (see Appendix F). Appendix G summarises the data analysis process.

Through asking questions relevant to symptoms of distress, feelings of anxiety emerge which indicate the operation of defences. Particular attention was paid to the way in which experiences of insomnia and MBSR were narrated and how feelings were communicated and related to within the interview. After the MBSR course, it was of interest whether there was a shift towards a more accepting and open position in relation to distress (and whether there was an association with improvement in sleep). Between the first and second interviews, questions were modified to more specifically explore defences and resistance.

Ethical and risk issues

The research received ethical approval from the Psychology Department Ethics Committee, University of Exeter. Informed consent was obtained and the right to withdraw was emphasised without consequence to an individual's position as a valued member of the MBSR course. All interviewees completed a comprehensive questionnaire prior to acceptance on the course which included assessment of physical and mental health conditions. One centre had a linked in psychiatrist for consultation and both teachers held professional counselling qualifications.

The process of making interpretations of the ‘defended subject’ can raise ethical concerns. Confidentiality and anonymity of data were prioritised at all stages of the research. However, what is written may be an aspect of an interviewee that is ‘hidden’ for the most part, brought only momentarily to conscious awareness during the interview. Once the research is written up, emotional conflicts may have been further defended against and or no longer available or real to the interviewee (Graves, 1996). The research sought to be sensitive and respectful in the way data was processed and reported, and there is acknowledgement of the power dynamics and inherent researcher subjectivity. Consideration will be given to the inclusion of material for future journal publication and where requests have been made to review the findings, a summary of the work will be offered.

Analysis

I addressed two sets of themes in my data consistent with the analysis framework for adapted biographical-interpretative analysis outlined in Clarke (2000). The first set concerned the psychodynamic and interview process that played out in the research environment. This was integral to data analysis and construction because strong psychological defences were evident for several interviewees and the defended subject analysis illuminated the importance of these to insomnia, help-seeking, and the experience of MBSR.

Three specific aspects of ‘projective identification’ were identified within the early-course interviews with relevance for understanding experiences of MBSR as told in the follow-up interviews. An understanding of the defended subject then informed the second level of analysis which enabled a holistic understanding of their sleep distress. Seven participants are discussed in total

in this analysis, three in more depth from a psychoanalytical perspective which is consistent with FANI methodology. For the purpose of succinct reporting, an overview of important common psychosocial themes is provided.

Part One

I identified the Kleinian concept of projective identification (1946) as a key defence mechanism which frequently played out in the researcher-interviewee dynamic when discussing insomnia and experiences of MBSR. In this process, unpalatable parts of the distressed individual become projected into the other, bringing about an experience within them or causing them to feel a certain way (Clarke, 2002). The recipient of the projection may then act as a container of feelings that are too distressing to tolerate. Ogden (1999) developed this idea to include a more coercive form of interpersonal projective identification where individuals may force an experience upon a recipient. When both communication and control are functional within projective identification, this has the impact of creating a ‘concerned object’ (Clarke, 2002), eliciting a response in the recipient.

Some participant information and details relevant to analyses have been redacted post-examination, for protection of participant identity and ethical reasons. The abbreviations [R…, “R…”] indicate where additional passages and quotations have been removed, which were part of the original analysis.

Projective identification as communication.

In my interview with Esther (60), [R…], experiencing chronic difficulties falling and staying asleep, there was a strong investment in the narrative of

absolute dedication to satisfying the needs of [clients] and family, such that aspects of her personal life were detrimentally affected.

> "… and obviously they've got [R…]… problems and I have to be on top of it, so I put <u>all</u> my energy into the day so that when I go home I think '<u>Ohhh</u>, [sighs], I can give in now."

As the interview progressed, I noticed feelings of frustration, which perhaps reflected the internal conflict Esther was experiencing, involving a strong desire to provide for others and at the same time resentment at how exhausting this could be. The tendency Esther had to split the bad from the good, to maintain a sense of control and personal coherence, was evident in her relationship to close family members where she seemed to project her needs for care onto them.

> "… and because there's a <u>LOT</u> I'm trying to remember you know, think for <u>everybody</u>… I'm thinking ↑ what she's got to do [youngest daughter], she doesn't live with me anymore but I'm sort of thinking <u>for</u> her as well."

> "… I just feel very <u>RATTY</u>, with everybody… I just said to my partner… ↑ 'RIGHT. I'm <u>VERY RATTY</u>, so if I get <u>RATTY</u> don't tell me I'm ratty because ↓ I already know I am."

[R…]. It seemed important to Esther to provide for others within her work, and to feel successful in this. She felt confident in her abilities to lead guided mindfulness practices in her work, perhaps understanding mindfulness to be a form of relaxation and escapism.

> "…the visualisation I do with them… I know [they] are going to just lie there and I can close my eyes for half an hour and I <u>KNOW</u> they are still there… I say ↑ "right, we're going", usually to Austria…they obviously don't realise that but that's where we go."

Esther did not report improvements to sleep from MBSR and explained the difficulty she experienced with being more open to, aware of, and accepting of emotional distress through guided practice. [R…].

> "…I'm thinking, this hurts just the same… I'm in the red zone and it makes it MORE intense…and then I found myself getting up and distracting because I thought ↑ 'that wasn't helpful'…

Esther positioned some of the struggle with MBSR within family members and the course facilitator. She emphasised the importance of it needing to be the 'right time' to benefit from the course, and perhaps she was not ready to prioritise herself and necessary change.

Projective identification as control.

In my interview with Bella, [R…], I felt there was an attempt to secure an interpretation of her frequent nocturnal awakenings. She reported a formulation of her sleep problem where symptoms were complex and not suited to traditional interventions. I felt there was an unconscious communication of frustration and a striving to solve the sleep problem, and yet a rational and philosophical perspective on the struggle was verbally presented. Bella had a professional and personal interest in mindfulness but was uncertain about the value of it for sleep. It seemed important to her that there was a sense of control in the research process [R…].

Interacting physical and mental health struggles had caused Bella distress over several years and she believed that physical causes associated with stress were at the root of sleeplessness, rather than "typical insomnia "[R…]. Bella explained just how hard it was to find the right support and relief from symptoms [R…]. As our interview progressed, she shared moments of

vulnerability including a reflection on how sleeplessness was impacting bed-sharing and her relationship [R…].

Bella reported reliable benefits to her sleep, specifically on the evenings of the MBSR course. She received nights of unbroken sleep, which was significant for her, and which she cautiously attributed to the "volume' of practise." She explained that disappointingly, however, the retreat day had not led to a good night of sleep and that this ran counter to the idea of a "dose-response". Bella reflected on the research objectives and how her experience fitted with these, rationalising conflicting parts and offering potential insights.

Projective identification as evoking the concerned object.

David (54), [R], experienced severe and acute sleep deprivation (within the context of chronic insomnia since youth), low mood and anxiety related to the foreseeable end to a turbulent relationship. He communicated a need to be taken care of through conscious and unconscious projections, eliciting empathy and care from me as I acted as container for the "torture" of insomnia and his fear of being alone without his partner. [X…].

> "Yeah, it's numb-skulling… I mean. Wow. I just don't even know like what I'd be able to say to somebody if you told me they were in my situation, coz I don't know anybody in that situation…so that's where I'm at with my compassion at the moment… even if they're homeless… ↑ on the street, as long as they are sleeping, I think they're in a better place than I am! [laughs heavily].

David communicated some insight into the relationship between emotional dysregulation, relational patterns, and the impact on sleep and recognised a role of the self in change processes.

> "IT'S TORTURE! ↑ And the thing is though, I'd describe my relationship as being torture as well, so I think ↓ it's kind of related, don't want to blame it on that, but I feel it's that sort of relationship…it keeps me up, whether we'll be together… it's not good, I shouldn't be worrying about all of that, I should be worrying about myself"

This projective identification was helpful to understand David's relationship to the MBSR course which he embarked on as a "last resort" to relieve his distress. In the follow-up interview, he attributed improvements to his sleep to the repair of his relationship. The MBSR course had perhaps been a container for his distress during a highly dysregulating episode. David later expressed an intent to undertake further MBSR training which was indicative of motivation for more holistic and transformative change and the internalised value of the course for his well-being.

Part Two

Insight into insomnia and relational secondary gains: motivation and psychological readiness for MBSR.

It was a consistent finding that interviewees' level of insight into insomnia was related to their underlying motivation for undertaking the course, and to their capacity to engage with and embody MBSR. Importantly, dysfunctional attempts to meet unmet relational needs were often implicated as causal in and/or exacerbating of insomnia. There was an absence of insight into the secondary gains involved in maintaining insomnia, and often the motivation for undertaking MBSR was unclear, contradictory, or communicated in another form (e.g. interest in teacher training).

Olivia (21), [R], experienced insomnia to co-exist with multiple physical complaints over the past three years. As the interview progressed, I began to wonder whether there was some conversion of mental distress into physical forms. Olivia, like the majority of interviewees, had not sought help for her sleep difficulties despite the impact this was having on her quality of life. She was non-specific and resistant to sharing her reasons for undertaking MBSR, "there's lots and lots of reasons." Several times she described "just rolling around" at night-time, revealing a lack of insight into distress and ineffective coping strategies. Anxiety was palpable when we touched on life events that were perhaps relevant to her symptoms.

> "I don't really know why [it started] … I was at college at the time, there was no real ↑reason, nothing ↑ happened that would trigger anything… ↓ if that's what you're asking."

I understood that Olivia was struggling with conflicting feelings associated with the separation from her family as she became an adult (e.g. a free association conveying ambivalence about having been travelling with a friend but now being back within the family home). I felt she was seeking to achieve emotional and physical independence, and this extended to a denial of her needs and vulnerability. Within her returned questionnaire she had referenced relational distress as underlying insomnia, however, she was dismissive of this when I raised it towards the end of the interview. Perhaps the conversion of her emotional symptoms into physical pain provided a more acceptable and sustainable way to elicit the continuation of care from her parents. Olivia's narrative contained many contradictions, at times she would focus predominantly on pain symptoms and towards the end of the interview

she explicitly revealed that her health complaints were manageable and insomnia was unrelated to this.

There appeared to be strong defences that perhaps protected Olivia from an otherwise unpalatable need to be cared for and feelings of vulnerability.

> "I worry about what I'm going to do basically, because I'm in-between…I worry what I'm going to do with my life and everything."

Olivia conveyed ambivalence about unearthing and processing the emotional conflicts underlying her distress. She recognised that MBSR had brought her closer to her struggles, and rationalised that due to "being new" to the practice and only just beginning her "journey", she had not yet experienced benefits to sleep. She was unsure what the future might hold for her emotional well-being with future practise.

Liana (51), [R…], revealed some insight into the source of her difficulties falling and staying asleep over the course of 15 years. This was related to chronic worry about the well-being of family members, especially her son struggling with a mental health disorder [R…]. I understood that behind this preoccupation was a fear of being unable to care for her loved ones, and of abandonment.

> "I do tend to- I have a lot of thoughts most of the time…↑ my son's got [R…] so sometimes I worry about him- ↓ he's older- he's grown up, he's 24 and doesn't live with me but sometimes I worry about him"

Liana stated a key reason for doing the course as wanting to be more able to help her son with his mental health. The importance of prioritising others (and minimising her own distress) perhaps compromised her capacity for engagement with and embodiment of MBSR. Liana did not report any explicit

benefits to her sleep, however, (perhaps partly to please me in my role as researcher) she focussed on what she had learned from the process: the need to prioritise sleep within her routine.

Liana seemed to have a greater appreciation of the importance of sleep and the benefits for well-being because of the course, however, the more fundamental need to keep others close to her was finally communicated when I offered resources and support and Liana requested self-help sleep resources for her mother with a degenerative condition.

Richard (48), [R…], reported significant benefits to sleep from the course through “holistic positive change” to his emotional well-being. Prior to the course, he communicated insight into his sleep difficulties which were related to his struggles coping with stress and with ineffective “mind-management.” He had an open and curious approach to the MBSR course as a result of his active interest in neuroscience and in mindfulness.

> “…there’s kind of an intellectual understanding… the limbic brain… which I sort of live and breathe…when I’m working with colleagues…connecting that and the sort of neuroscience with the breath…being in touch with your body… so the breathing practices, the meditation… that’s been a very nourishing experience…. it’s made a lot more sense and meaning to me, rather than it just being theoretical.”

It was interesting that Richard was the only interviewee not to convey relational distress, and to describe his primary relationship as supportive during his struggles with sleep and throughout recovery. He seemed to authentically communicate a capacity to reflect on relational experiences in such a way as to process these and modify his behaviour in line with his values. Within this

research, his transformational experience of the MBSR course was powerful and indicated the benefits of having insight into insomnia symptoms and an existing belief in the value of mindfulness as an intervention for greater emotional resilience.

Knowledge of sleep processes and attitudes towards interventions for insomnia.

Almost all interviewees mentioned 'sleep-promoting' behaviour (e.g. sleep hygiene), as primary interventions for sleep, purported by medical professionals. Consistently, interviewees were either not following guidelines, (leading to a sense of shame for 'not doing enough' to 'help themselves'), were overly focussed on the guidelines despite no improvement to sleep, or were using the guidelines as evidence for sleep being highly problematic, placing the emphasis back on themselves to solve their distress (and reinforcing defences).

> Olivia: "my doctor talked to me about sleep hygiene…so I know that I should do it, but…I would be teaching classes in the evening so I couldn't eat at a normal time…and then I'd end up eating quite late, or working out quite late and I know that that's not good for sleep, but I did do that quite often."

> Esther: "RIGHT well, the room is very dark, I have ear-plugs… something over my eyes, so I try and block out the room, I always open the window… so I've tried all that… and I never look at the clock, it's the worst thing you can possibly do…"

> Liana: "…↑ I'll just blame it on everything really…it's too light in the room, too noisy…but really [laughs]… there must be some other reason I'm not getting, I don't know what it is really."

These beliefs and behaviours are in contradiction to the natural, biological and unconscious processes that come together to achieve a state of

sleep and are also conceptually dystonic with acceptance-based approaches to distress.

Interestingly, the interviewees who were referred to mental health services for support with their sleep were presenting with co-existing complaints of depression and anxiety. Therefore, only when insomnia was syndromal and complicated by another mental health disorder was it taken seriously as worthy of specific intervention. Indeed, only David and Richard described their sleep difficulties as a motivation for MBSR, despite the chronicity of the complaints and the high level of disturbance to everyday life reported by all interviewees. Bella was the only interviewee to use the word ‘insomnia’ and did so to reject this terminology as an appropriate term for her experiences. This may reflect a cultural reluctance to acknowledge the psychological disturbances inherent in this diagnosis, a lack of education about the condition, and even a fear of acknowledging this persistent condition for which there is limited help available.

In addition, for several interviewees there was a narrative about the pressures of their professional lives as being central to insomnia symptoms. The perceived need to deliver a high level of performance, at a cost to sleep, was accepted, expected or even glorified. Sometimes a lack of sleep seemed to be marker of conscientiousness and commitment. In this way, prioritising work performance over sleep and self-care may be culturally reinforced, perhaps blurring the line between insomnia as a choice and insomnia as mental health difficulty.

Holistic and direct benefits of MBSR for sleep, and conceptual and practical considerations

Richard described transformative and 'holistic' benefits to his capacity to manage the demands of day-to-day life, which had a positive impact on his sleep. His prior experience of mindfulness, and an existing personal affiliation with the underlying philosophy, facilitated a capacity to be open to and curious about how MSBR related to sleep processes.

> "I would say it's [MBSR] the first strategy, to really look into, as… a holistic solution for much improved sleep… it's not just about having a hot drink… and not drinking coffee and not watching telly… it is much deeper… related to the subconscious… I would say mindfulness is the solution to it."

For Liana, her pre- and post-course narratives highlighted the process by which she saw holistic change to be possible from MBSR, which could in turn improve sleep. In her first interview, she was already preoccupied with how to successfully apply the body-scan practice to her sleep and this intention and effort was making her difficulties more pronounced.

> "…when I'm in bed at night and my mind starts to drift off, I suddenly realise, ↑"oh I might be going to sleep now", and I bring it back again so…it seems to be making it worse, because I'm not allowing my thoughts to drift off now."

At the post-course interview, however, Liana reflected on how increased mindfulness practice and refined skills had facilitated a shift in her relationship to her sleep difficulties. She was more able to allow her experiences to 'be' at night-time and for sleep processes to take over. Liana had a clearer vision of behavioural changes necessary to improve

sleep but also had a greater appreciation of the process of mindfulness and how embodiment of the practice was key.

> "… as time went on with it obviously I found the meditation really good…for other things, like during the day, to stop worrying about stuff, and just um you know bring my awareness back to the present moment, but what I found with the sleep survey, when I started to fill out the form…was that I started to notice a pattern in what I was doing, and I could see why I wasn't getting enough sleep, basically."

> "I think, just doing bits here and there… I don't really think it would help much for sleep, but definitely a longer meditation would give you more time to relax, and a lying down meditation is definitely going to be more beneficial … if you're going to want it to help you with sleep, because then you can… really feel that your body is relaxing, and you can probably relate that to when you go to bed at night."

Several interviewees discussed the contradiction between embodying the idea of being 'mindfully awake' within MBSR practice and a tendency to fall asleep during lying down practices such as the body scan. I wondered whether an acute awareness of such contradictions (accentuated by their research participation) created further anxiety around the conditions necessary for sleep and the need for control over sleep processes. For Bella, her professional background and previous experience of mindfulness enabled her to consider these contradictions and to offer insights into improving the acceptability of the course for those with insomnia symptoms.

> "…the philosophy isn't fall asleep doing the body scan…it's <u>stay awake, be aware</u>. So there's a bit of a (sighs), ↑ almost a contradiction there?... it should be either… do your body scan twice a day, once in the morning where you're aware or at some point during the day when

> you know you're not going to fall asleep but then allow yourself to do it again in the evening when you're in bed, trying to go to sleep. Because most of the time it will help you to go to sleep."

In addition, Bella felt that practical issues, including the structure and timing of the course, were important barriers to accessing the full benefits of MBSR. Physical health considerations, including dietary needs and management of fatigue levels, were difficult to manage on an evening course involving travel and a delay to the evening routine.

Ryan (24), [R…], reported positively on the body-scan as a technique for initiation and maintenance of sleep, "it *will* get you to sleep", however, this effect was a source of anxiety when he experienced extremes of sleepiness. He described finding it 'impossible' to stay awake during many of the practices due to the collaborative impact of nocturnal awakenings, medication for anxiety and general exhaustion from work. With the support of the course leader, he adapted practices to improve the acceptability of the materials, however, he commented on the exhaustion involved with this and the challenges of accessing MBSR as an evening course when there is a requirement to drive home afterwards. A general concern was raised by a few interviewees about compromised self-care and safety when sleep deprived and participating in an evening MBSR course.

Olivia, Liana, David and Charlotte (R…, 48) all described a benefit of MBSR to be an increased awareness of the need to make lifestyle changes, to accommodate and prioritise night-time routine and to ultimately achieve outcomes consistent with their values.

Discussion

This research sought to understand the acceptability of the eight-week MBSR course as a candidate intervention for insomnia symptoms within a community setting. Holloway and Jefferson's method was followed which involved an analysis of the defended subject to gain a holistic understanding of interviewee experiences, inclusive of complexity.

The psychosocial analysis indicated that for several interviewees, strong psychological defences were associated with insight into emotional distress and a reluctance for help-seeking. Chronic insomnia was not recognised as a mental health difficulty but something that they should be able to get under control with sufficient effort. Despite high levels of anxiety and/or avoidance, these individuals voluntarily accessed the MBSR course as a forum for emotional support. It is possible that the skills-based, community group format of the course is perceived as more acceptable than individual therapy as a forum for psychological support. However, for the interviewees with relational issues underlying emotional distress, there was often both a wish to improve symptoms and a converse wish to maintain the status quo. MBSR participation alone may be insufficient for improving sleep for some individuals, and it may be most effective as an adjunct to a relational therapy. Indeed, Ong and Sholtes (2010) illustrated the importance of the therapist relationship for facilitating significant improvement to sleep by working through resistance associated with mindfulness.

Richard's case suggested that MBSR may be more readily acceptable as a stand-alone and primary intervention for repeated episodes of acute insomnia related to work-related stress, consistent with preliminary evidence in healthy

populations (e.g. Quertstret, Cropley & Fife-Schaw, 2017). Furthermore, prior engagement with the concepts of mindfulness and an affiliation with the philosophy were facilitative of benefits to sleep. There was preliminary evidence for generalised benefits to emotional coping and resilience, and an increased capacity to be with and accept moment to moment experiences. This led to a lessening of dysregulation at night-time, i.e. lessening of secondary arousal.

Specifically, the body-scan practice was reliably experienced as highly facilitative of natural sleep processes. This finding is consistent with a qualitative study by Hubbling, Reilly-Spong, Kreitzer and Gross (2014) and suggests this practice as targeting important change mechanisms (e.g. strengthening positive associations associated with lying down and accepting spontaneous experiences without a conscious aim to ‘induce’ sleep). For some, the process of MBSR also led to increased value placed on the importance of sleep for well-being and a prioritisation of sleep-related self-care, e.g. a motivation to improve night-time schedules and to minimise stimulation.

Interviewees highlighted the need for modifications to the current MBSR course in order to improve the acceptability for fatigued and sleepy individuals. Conceptual contradictions between MBSR philosophy and the experience of falling asleep (e.g. during practise) and between ‘acceptance’ of distressing symptoms and ‘sleep hygiene’ principles (e.g. stimulus control) should be resolved early on to avoid further anxiety and to support individuals to fully embody their practise.

Clinical implications

It may be beneficial to incorporate a module about acceptance-based approaches to insomnia including psychoeducation about primary and secondary arousal processes in the maintenance of insomnia. This approach diverges from behaviourally focused mindfulness interventions for insomnia (e.g. Ong et al., 2014) which have shown only limited benefit above traditional MBSR and is consistent with participant feedback that sleep-specific cognitive material is most highly valued (e.g. Ong, Shapiro & Manber, 2008).

Acceptance and commitment therapy (ACT) is highly compatible with MBSR, has a growing evidence base for effectiveness for insomnia (Dalrymple, Fiorentino, Politi & Posner, 2010) and is entirely consistent with the development and increased popularity of meta-cognitive models of insomnia (Ong et al., 2012). Creative helplessness (Harris, 2016) as a tool may facilitate a shift in attitude towards insomnia and permission giving to let go of rigid and repetitive behaviours.

Within the field of clinical psychology, professionals should uphold and practise the importance of sleep for mental health and emotional resilience and be sufficiently knowledgeable about sleep processes and models of insomnia to be confident in formulation and intervention. It is imperative to take seriously the impact of insomnia for those suffering in order to facilitate help-seeking behaviour and reduce stigma around the condition (Henry, Rosenthal, Dedrick & Taylor, 2013). Level of insight into insomnia, capacity to prioritise self-care, mindfulness practice and level of current emotional dysregulation may be important issues for considering treatment options. It may be most appropriate for specific practices to be recommended as a way to contain distress and to

foster mindfulness skill, (e.g. the guided body scan), until an individual feels able to commit to the course or until their ambivalence about change has been resolved.

Limitations

This study may have involved a disproportionately large number of interviewees with strong psychological defences around sleep and ambivalence about change processes. This may be an artefact of the recruitment process which requested the participation of self-reported poor sleepers but did not specify that individuals were help-seeking for the complaint or had an existing diagnosis of insomnia. It is possible that for several of the interviewees the opportunity to express helplessness in a contained space was a key motivating factor for participation. More persuasive results for the appropriateness of MBSR as an intervention for insomnia may be revealed for individuals with greater insight into their symptoms and/or a diagnosis because this is likely to be associated with a higher level of motivation to improve sleep (e.g. Hubbling et al., 2014). Furthermore, the recruiting MBSR centres were private providers with self-funding participants and this may have affected access to the diversity of insomnia presentations that may be most prevalent within public mental and physical health services.

The research did not consider all factors influencing the experience and outcome of MBSR such as hours of personal practise and relationship with course facilitators, which have previously been indicated as potentially important predictors of outcome (Ong et al., 2008). Furthermore, time-limited telephone interviews placed a restriction on the access to the ‘total’ experience of the participants available for interpretation. Indeed, conclusions cannot be

drawn as to the mechanisms of change involved with improvement to sleep following MBSR.

The analysis involved both an inherent power-dynamic (through the researcher interpretation of defences) but also an active role of myself as researcher in co-constructing the meaning of the data. Whilst there was a peer review process, supervision, and researcher reflection and reflexivity (which enhances the credibility of the interpretations offered) the nature of this work inherently limits its generalisability. Whilst the “defended subject’’ analysis facilitated valuable insights relevant to clinical practice for insomnia, the results may also be considered to have a largely ‘negative tone.’ In part, this is likely to be due to sample characteristics (as previously discussed), however, it is also an artefact of the analytical approach informed by psychodynamic concepts. Within an alternative analytical framework, the helplessness conveyed by participants may be given lower prioritisation within the results. There were several significant, positive findings which were highlighted, however, within a relatively short report it can be challenging to consolidate these effectively.

There are specific ethical implications related to the analysis used, particularly with respect to publication. A high level of care is required to deal with these sensitively, to ensure anonymity and respect for the interviewees and their narratives. Participant experiences were conveyed within the researcher-interviewee dynamic, at a specific time-point, under specific circumstances. It is not assumed their experiences (co-constructed) are psychologically accessible or acceptable to them at a future time point.

Researcher reflexivity

My research background in this area and interest in improving access to effective treatments for insomnia was the motivating factor behind the design of this study. Interpretations were inevitably influenced to a certain extent by similarities of experience between myself and interviewees, including being British, having experience and interest of MBSR, being a helping-professional with high work demands and having had personal experience of insomnia. This may have enhanced the credibility of my interpretations and provided a more empathic space for interviewees to share their experiences. However, it may also have led to the prioritisation of some data over more nuanced data. The defended subject analysis, interviews at two time points, reflexive diary keeping, peer reviews and workshop discussion of transcripts were imperative processes for guarding against bad interpretations and assisting with good ones. Indeed, there was evidence of demand characteristics within the interviews (e.g. finding positives to offer me as researcher) which were critical to consider within the 'whole' of the transcript and would otherwise have led to misguided interpretations.

Future research

The following recommendations are made for future research in this area.

- Replication of the current study with extended, in-person interviews.
- Acceptability and effectiveness of MBSR as an intervention for insomnia incorporating an ACT module.
- Identifying the mechanisms of mindfulness that promote improvements to sleep, e.g. those implicated in the body scan.

- Theoretical research (e.g. attachment informed) considering the role of relational conflict in persistent insomnia and the implications for improving access to community interventions.
- Acceptability and effectiveness off alternative acceptance-based approaches for insomnia, e.g. mindfulness-based cognitive therapy.
- Comparison of acceptability/effectiveness of CBT-I and MBSR for different populations.

Conclusion

To the author's knowledge, this is the first qualitative interview study to investigate participant experiences of insomnia (inclusive of complexity, co-existing physical and mental health distress) over the course of a community-based MBSR course. This is also the first study to investigate the experiences of an intervention for insomnia from a psychosocial perspective inclusive of the defended subject. Although the findings reported are preliminary and tentative, they offer novel and valuable insights into the acceptability of MBSR as an intervention for insomnia and the barriers to engagement for some individuals, particularly those with relational conflicts. It will be beneficial to develop and evolve this work in order to inform a treatment algorithm for insomnia inclusive of complexity of presentation, level of insight, relational distress, readiness for change and need for adjunct personal therapy. Through maximising the acceptability of the traditional MBSR course for poor sleepers, it may offer an effective and accessible intervention for insomnia.

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Appendices

Appendix A: Results of quantitative measures PSQI and ISI

Participant (age)	PSQI pre-course	ISI pre-course	PSQI post-course	ISI post-course
Esther (60)	**Global= 10 "poor sleeper"** Quality= 3, latency= 0, duration= 2, efficiency=2 (67%), disturbance=2, meds=0, dayimp=1	**Total= 19: "clinical insomnia" moderate severity** Falling asleep=0, staying asleep=3, waking too early=3, satisfaction=3, noticeable= 3, worried/distressed=3, interference with life=4.	**Global= 14 "poor sleeper**" Poorer sleep latency, efficiency and greater daytime impairment. Life events experienced to be difficult to cope with.	**Total= 23: "clinical insomnia" severe** More severe symptoms reported across subscales.
Bella (47)	**Global= 12 "poor sleeper"** Quality= 3, latency= 1, duration = 2, efficiency= 3 (52.63%) disturbances=2, meds=0, dayimp=1	**Total= 20: "clinical insomnia" moderate severity** Falling asleep= 0, staying asleep= 4, waking too early= 4, satisfaction= 4, noticeable= 3, worried/distressed= 1, interference with life = 4.	**Global = 12** (+ 1 point duration, -1 point daytime impairment)	**18: "clinical insomnia" moderate severity** Some scores improved, some worsened.
Liana (51)	**Global =13 "poor sleeper"** Quality= 2, latency= 3, duration-2, efficiency = 3 (59%), disturbance= 2, meds=0, dayimp = 1	**Total= 18: "clinical insomnia" moderate severity** Falling asleep =3, staying asleep=3, waking too early= 2, satisfaction=4, noticeable=1, worried/distressed=3, interference with life =2.	Returned qualitative diary information	
Olivia (21)	**Global= 12 "poor sleeper"** Quality= 2, latency= 3, duration =1, efficiency =2 (74%), disturbances=2,	**Total=14: "sub-threshold insomnia"** Falling asleep=3, staying asleep=1, waking too early=2, satisfaction= 3, noticeable=1, worried/distressed=2,		

	meds=1, dayimp=1	interference with life=2.	
Richard (48)	**Global= 9, "poor sleeper"** Quality = 2, latency = 0, duration= 2, efficiency= 2 (70%), disturbances =2, meds=0, dayimp= 1		**Global: 6** (improvements across subscales, efficiency= 93%, however, longer sleep latency +2 points)
Ryan (24)	**Global=8, "poor sleeper"** Quality= 2, latency= 1, duration =1, efficiency= 1, disturbances=2, meds=0, dayimp=1.	**Total= 16: "clinical insomnia", moderate severity** Falling asleep=0, staying asleep=3, waking too early=3, satisfaction=3, noticeable=2, worried/distressed=3, interference with life=2.	
David (54)	**Global = 16 "poor sleeper**" Quality= 3, latency= 3 duration=3, efficiency= 0, disturbance=2, meds=3, dayimp=2		
Charlotte (48)	**Global = 9** Quality=1, latency=1, duration=2, efficiency (70%) =2, disturbances=2, meds=0, dayimp=2		**Global=6** (improvements across subscales, 79% efficiency). Returned qualitative diary information.

Appendix B: FANI interview principles

FANI principles
1) Open ended questions To encourage interviewees to talk about meaning and quality of experience 2) Eliciting a story Through open-ended questions and curiosity, the particular story told, the manner and detail of its telling, points emphasised and morals drawn represent meaningful choices. 3) Avoid using ‘why questions’ To avoid socially cliched answers and to encourage a story/narrative/journey rather than an intellectualised explanation 4) Use interviewees ordering and phrasing Careful listening in order to prepare follow-up questions using interviewees own words and phrases without interpretations

Appendix C: Interview questions

Interview questions

Early-course interview questions

1. Can you tell me about your experiences with poor sleep?
2. Can you tell me about the time when your difficulties with sleep started?
3. Can you tell me about things you have tried to help you with your sleep?
4. Can you tell me about how poor sleep impacts on your life?
5. Can you tell about your interest in mindfulness-based stress reduction?

Post-course interview questions

1. Can you tell me about your experience with sleep from participating in the MBSR course?
2. Can you tell me about your experience of the practices within the course?
3. Can you tell me about anything you've noticed as having changed from doing the course?
4. Can you tell me about your views of MBSR in relation to sleep difficulties?

Appendix D: Transcription conventions

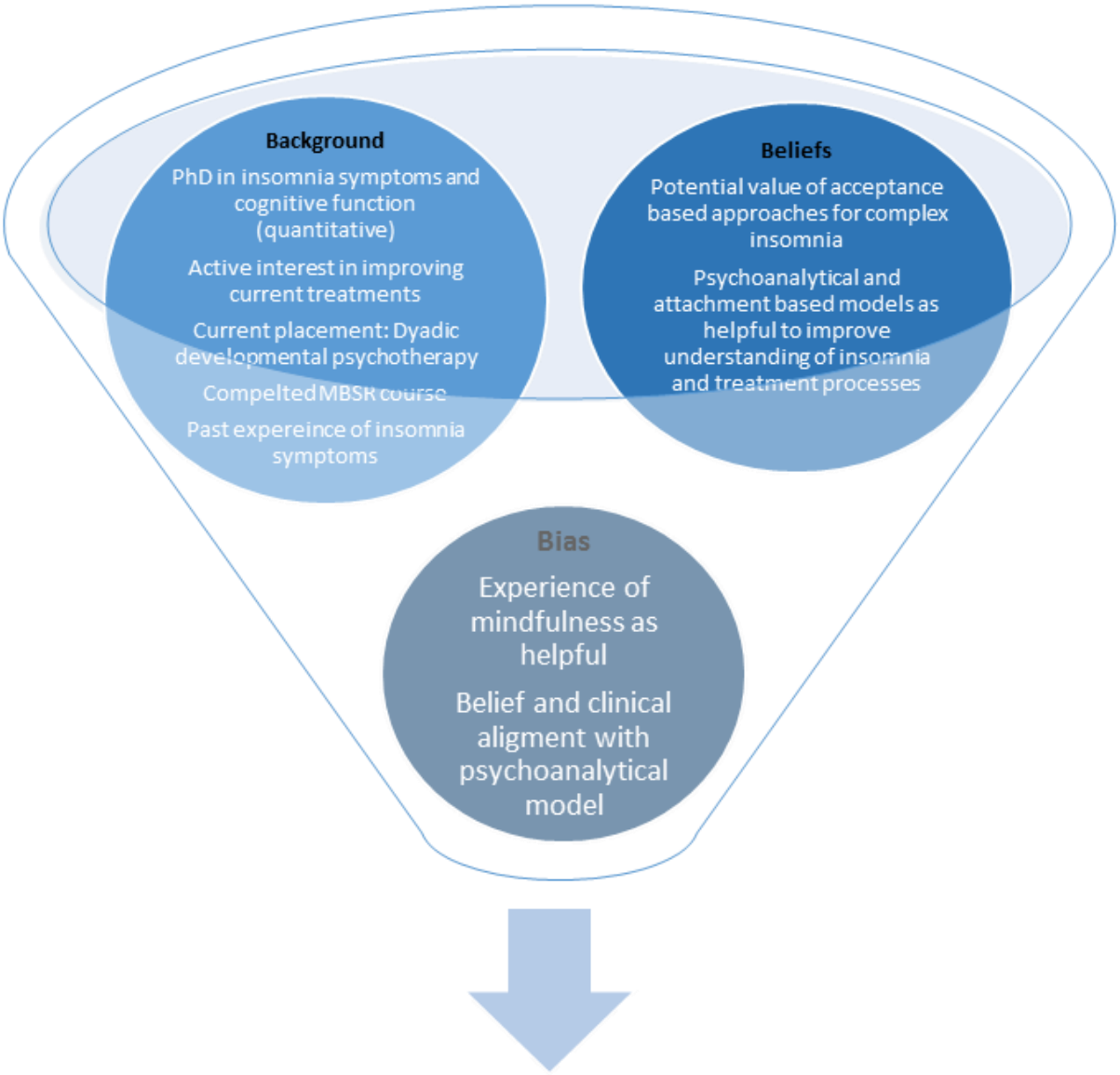
For the purposes of thesis reporting:

…	Indicates short utterances having been removed
* *	Indicates subject matter
’	A dot enclosed in brackets indicates a pause in the talk of less than two-tenths of a second.
=	‘Equals’ sign indicates ‘latching’ between utterances.
[ ]	Square brackets between adjacent lines of concurrent speech indicate the onset and end of a spate of overlapping talk.
(( ))	A description enclosed in a double bracket indicates a non-verbal activity.
-	A dash indicates the sharp cut-off of the prior sound or word.
:	Colons indicate that the speaker has stretched the preceding letter.
(inaudible)	Indicates speech that is difficult to make out. Details may also be given with regards to the nature of this speech (e.g. shouting).
	A full stop indicates a stopping fall in tone. It does not necessarily indicate the end of a sentence.
↑↓	Pointed arrows indicate a marked falling or rising intonational shift. They are placed immediately before the onset of the shift.
<u>Under</u>	Underlined fragments indicate speaker emphasis.
CAPITALS	Words in capitals mark a section of speech noticeably louder than that surrounding it.
° °	Degree signs are used to indicate that the talk they encompass is spoken noticeably quieter than the surrounding talk.

Apppendix E: Example of notes, pro-forma, pen portrait and reflexive journal collectively informing analysis

Redacted resource.

Appendix F: Researcher background, beliefs, bias



Researcher position

Appendix G: Steps in data processing

Steps in Data Processing (as recommended in Holloway & Jefferson, 2013).

Data processing
1) Demographic data collated from MBSR booking forms, summarised in tabular format 2) Listening to and transcribing audio recordings First stage of interpretation, familiarisation with data and immersion. Theoretical thinking about data, issues, themes etc. within whole text. 3) Theoretical understanding of data developed underpinned by idea of 'defended subject.' Each transcript accompanied by continuously evolving set of notes identifying key themes and experiences and theoretical observations of psychological mechanisms 4) Start making links and looking for similar occurrences of experience. For example, different forms of projective communication and unconscious experience identified through careful comparisons across notes and pro-formas.

Appendix H: Participant pack

1. Information sheet

Participant Information Sheet

Mindfulness based stress reduction and insomnia symptoms

Thank you for your interest in this study. My name is Dr Louise Baker and I am a Trainee Clinical Psychologist at the University of Exeter.

The purpose of this study is to understand how MBSR might be related to sleep. MBSR has been shown to be effective for reducing stress and anxiety in healthy individuals and those with health problems, but we are in the early stages of understanding the potential benefits for sleep disturbance. This is a new, exciting area of research which will be helpful in shaping the development of effective interventions for those with sleep problems. Your participation will be greatly valued.

Participation in this study will involve two interviews about your sleep. The first interview will take place before the course begins (or early within the course) and the second interview will take place a few days after the end of the course. Depending on your availability and preferences, these interviews may take place over the phone or in person and should last between 15 and 25 minutes. These interviews will be audio recorded. I will also provide a simple daily sleep log for you to keep written notes over the 8-week course. These will take no longer than a few minutes to complete and are intended to help you remember your sleep patterns. Two brief sleep questionnaires will also be completed at the beginning and end of the MBSR course.

You are under no obligation to take part in this study and a decision not to participate will have no impact on your experience as a member of the MBSR course. If you chose to participate but later wish to withdraw there will be no consequences. If you are unsure whether the process of monitoring your sleep

might be unhelpful for you in some way and wish to discuss this then please do contact me.

The information which you provide for this study will be handled with confidentiality and not shared with anyone who is not part of the immediate research team. The exception to this is if information is shared which indicates high levels of psychological distress and risk to yourself. In this case, we would discuss with you the need to contact your GP and/or members of your support network in order to ensure your safety and well-being.

After the interviews, your data will be given a unique code and will no longer be traceable to your personally identifying information. No personally identifying information will be reported in any written work. Audio recordings of the data will be destroyed at the end of the project by the researcher.

After the study finishes, I will provide a debriefing sheet which will give you more information about the research. There will also be the opportunity to discuss strategies and approaches that may be helpful for improving your sleep. If you wish to have any further information about the results please contact me using the details on the debrief form.

The findings of this study will be written up and reported as a thesis in part completion of the Doctorate in Clinical Psychology. In accordance with University of Exeter Open Research Exeter policy, the thesis will be stored electronically at the University of Exeter, and will be accessible online. In addition, the research may be written up for publication in journals which will be available online and may also be presented at conferences.

Thank you very much for your help.

2. Consent form

Participant consent form

Mindfulness based stress reduction and insomnia symptoms

This study investigates how sleep is experienced before and after participation in an 8 week MBSR course and will involve two questionnaires and an interview at two time points.

Name of researcher: Dr Louise Baker, University of Exeter

Research collaborators: S.H, ****** ********** ******

B.M ********** *********

1. I confirm that I have read and understood the information sheet for the above study.

2. I understand that my personal details will be kept secure and no identifiable details will be used as part of the research results.

3. I understand that interviews will be recorded for the purpose of data collection

4. I understand that my participation is voluntary and that I am free to withdraw at any time without prejudice.

5. I agree to take part in the study.

Name:

Signature:

Date:

3. Screening questionnaires

a) Insomnia Severity Index

Insomnia Severity Index

For each question, please *CIRCLE* the number that best describes your answer.

Please rate the *CURRENT (i.e. LAST 2 WEEKS) SEVERITY* of your insomnia problem(s).

Insomnia problem	None	Mild	Moderate	Severe	Very severe
1. Difficulty falling asleep	0	1	2	3	4
2. Difficulty staying asleep	0	1	2	3	4
3. Problem waking up too early	0	1	2	3	4

4. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?

Very Satisfied Satisfied Moderately Satisfied Dissatisfied Very Dissatisfied

0 1 2 3 4

5. How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?

Not at all Noticeable A Little Noticeable Somewhat Noticeable Much Noticeable Very Much Noticeable

0 1 2 3 4

6. How WORRIED/DISTRESSED are you about your current sleep problem?

Not at all Worried A Little Worried Somewhat Worried Much Worried Very Much Worried

0 1 2 3 4

7. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?

Not at all Interfering A Little Interfering Somewhat Interfering Much Interfering Very Much Interfering

0 1 2 3 4

b) Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index

Name_____ Date _____

Instructions:

The following questions relate to your usual sleep habits during the past month *only*. Your answers should indicate the most accurate reply for the *majority* of days and nights in the past month. Please answer all the questions.

1. During the past month, when have you usually gone to bed at night?

   usual bed time

   _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

   number of minutes_____

3. During the past month, when have you usually got up in the morning?

   usual getting up time

   _____

4. During the past month, how many hours of *actual* sleep did you get at night? (This may be different than the number of hours you spend in bed).

   hours of sleep per night

   _____

For each of the remaining questions, check the one best response. Please answer *all* questions.

5. During the past month, how often have you had trouble sleeping because you……

(a) Cannot get to sleep within 30 minutes

Not during the past month ____ Less than once a week _____ Once or twice a week _____ three or more times a week

(b) Wake up in the middle of the night or early morning

Not during the past month ____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

(c) Have to get up to use the bathroom

Not during the past month ____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

(d) Cannot breathe comfortably

Not during the past month ____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

(e) Cough or snore loudly

Not during the past month ____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

(f) Feel too cold

Not during the Less than Once or three or more

past month____ once a week_____ twice a week_____ times a week _____

(g) Feel too hot

Not during the Less than Once or three or more

past month____ once a week_____ twice a week_____ times a week _____

(h) Had bad dreams

Not during the Less than Once or three or more

past month____ once a week_____ twice a week_____ times a week _____

(i) Have pain

Not during the Less than Once or three or more

past month____ once a week_____ twice a week_____ times a week _____

(j) Other reason(s), please describe_____

_____

_____

How often during the past month have you had trouble sleeping because of this?

Not during the Less than Once or three or more

past month____ once a week_____ twice a week_____ times a week _____

6. During the past month, how would you rate your sleep quality overall?

Very good_____

Fairly good_____

Fairly bad_____

Very bad_____

7. During the past month, how often have you taken medicine (prescribed or " over the counter") to help you sleep?

Not during the past month ____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month ____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all _____

Only a very slight problem ___

Somewhat of a problem _____

A very big problem _____

10. Do you have a bed partner or roommate?

No bed partner or roommate _____

Partner/roommate in other room _____

Partner in same room, but not same bed ___

Partner in same bed _____

4. Debrief sheet

Mindfulness based stress reduction and insomnia symptoms

Thank you for your participation in this study. The research team is interested in how poor sleepers experience a Mindfulness based stress reduction course in relation to symptoms of disturbed sleep.

Lundh (2005) provides a rationale for why the acceptance-based approach of MBSR is likely to be beneficial for improving symptoms in those reporting poor sleep. Sleep is facilitated by reduced activity of thought processes and reduced verbal regulation of internal experiences when compared to daytime functioning. Good sleepers are able to accept spontaneously occurring physiological and mental processes. Poor sleepers, however, often struggle with the discomfort of sleep disturbance and (consciously or unconsciously) attempt to control their internal experiences and reactions to the environment. This often involves rumination and the verbal over-regulation of thoughts and emotions. These responses, or 'control strategies' are intended to facilitate sleep, however, they have the opposite effect of increasing arousal, therefore, exacerbating and maintaining sleeplessness.

It is proposed that through developing MBSR skills an accepting approach towards the distressing symptoms of sleeplessness can be fostered. As a consequence, the overactivity of thought-processes and attempts to manage these through verbal regulation may be reduced. Through learning to give up the 'struggle' of sleeplessness it is more likely that natural sleep processes, regulated by biological mechanisms, can once again function more effectively.

There is growing evidence for the effectiveness of MBSR as an intervention for sleep problems, with the majority of research having been conducted in the context of chronic health conditions (Winbush et al. 2007). Improvements to sleep as a result of MBSR have been measured quantitatively (e.g. data collected in questionnaires or live recording of sleep) which is important for determining that the intervention can lead to positive changes in sleep.

The current study, however, was designed to understand the acceptability of MBSR as an intervention for poor sleepers in a community setting from the perspective of participants. Qualitative studies (e.g. using an interview method) allow researchers to obtain a detailed participant account of *how* the experience of MBSR might lead to

improved sleep. To date, there has been very little attempt to understand the experiences of participants in this way yet narrative data is extremely important for developing an understanding of the processes which lead to change. Importantly, this information may inform the development of future interventions designed to help those with poor sleep.

Results of this study will not include your name or any other identifying characteristics. The study did not involve deception. If you wish you may have a review of the research findings once the project is completed.

If you would like to further discuss sleep-related problems then please contact your general practitioner. You may also find the following websites helpful for support and advice: www.insomniacs.co.uk, www.sleepcouncil.org.uk.

If you have any further questions or concerns about this study please do not hesitate to contact Louise Baker (Trainee Clinical Psychologist) (ldb207@exeter.ac.uk) and S.H (**********) Dr Janet Smithson is the research supervisor (J.Smithson@exeter.ac.uk) and the Ethics Chair is Lisa Leaver (L.A.Leaver@exeter.ac.uk).

Appendix I: School of Psychology Ethics Approval

Your application for ethical approval (2016/1207) has been accepted

A

apache@exeter.ac.uk

on behalf of

Ethics Approval System <D.M.Salway@exeter.ac.uk>

Reply all

Mon 11/04/2016, 14:45

Baker, Louise

Inbox

Ethical Approval System

Your application (2016/1207) entitled Mindfulness based stress reduction and insomnia symptoms has been accepted

Please visit http://www.exeter.ac.uk/staff/ethicalapproval/

Please click on the link above and select the relevant application from the list.

Appendix J: Dissemination statement

The results of this study will be disseminated to interested parties through feedback, journal publication and presentation.

Dissemination to participants and NHS services.

Participants involved in the study will be provided with a summary of the findings at their request, relevant contact details are included in the debrief sheet. Field collaborators and staff involved with the mindfulness centres will be provided with a summary of the findings. RD&E Research and Development team will be sent a summary of the findings of the study and will be informed that the study is now complete.

Journal Publication

It is expected that the study will be submitted for publication within the Journal of Sleep Research (Impact factor 3.259).

Aims and scope.

The *Journal of Sleep Research* is dedicated to basic and clinical sleep research. The Journal publishes original research papers and invited reviews in all areas of sleep research. The Journal aims to promote the exchange of ideas between basic and clinical sleep researchers coming from a wide range of backgrounds and disciplines. The Journal will achieve this by publishing papers which use multidisciplinary and novel approaches to answer important questions about sleep, as well as its disorders and the treatment thereof.

Presentation

I am a key speaker at a conference on sleep for NHS Healthcare Trust psychology and psychiatry clinicians on the 28th June 2018. I will be presenting the results of this research within my presentation covering interventions for insomnia. The findings will also be presented orally for one of the mindfulness centres within an educational meeting for professionals.

Appendix J: Author guidelines: Journal of Sleep Research

Manuscript submission

The Journal of Sleep Research receives all manuscript submissions electronically via its submission and review website.

Effective with the 2012 volume, this journal will be published in an online-only format. Print subscription and single issue sales are available from Wiley's Print-on-Demand Partner. To order online click here http://www.sheridan.com/LPM/Wiley

The Journal of Sleep Research employs a plagiarism detection system. By submitting your manuscript to this journal you accept that your manuscript may be screened for plagiarism against previously published works.

Pre-submission English-language editing: If you are not a native Englishlanguage speaker, we strongly recommend that you have your manuscript professionally edited before submission. A list of companies that will edit your manuscript for a fee can be foundhere. Professional editing is not compulsory, but will mean that reviewers are better able to read and assess your manuscript. Use of one of these companies does not guarantee acceptance or preference for publication in this journal.

To submit a manuscript, please follow the instructions below.

Getting Started

1. Launch your web browser (Internet Explorer 5 or higher) and go to the journal's ScholarOneManuscripts homepage

(http://mc.manuscriptcentral.com/josr - please note the acronym). Click the "Create Account" option if you are a first-time user of ScholarOne Manuscripts.

2. After clicking on "Create Account", enter your name and e-mail information and click "Next". Your e-mail information is very important.
3. Enter your institution and address information as appropriate, and then click "Next".
4. Enter a user ID and password of your choice (we recommend using your email address as your user ID), and then select your area of expertise.
5. Click "Finish".
6. Log-in and select "Author Center".

Submitting your manuscript

1. After you have logged in, click the "Submit a Manuscript" link in the menu bar.
2. Enter data and answer the questions as appropriate.
3. Click the "Next" button on each screen to save your work and advance to the next screen.

You are then required to upload your files:

4. Click on the "Browse" button and locate the file on your computer.
5. Select the designation of each file in the drop down next to the Browse button.
6. When you have selected all files you wish to upload (in groups of 3), click the "Upload Files" button.
7. Review your submission (in both PDF and HTML formats) before sending to the Journal. Click the "Submit" button when you are finished reviewing.

You may suspend a submission at any phase before clicking the “Submit” button and save it to submit later. After submission, you will receive a confirmation e-mail. You can also access ScholarOne Manuscripts any time to check the status of your manuscript. The Journal will inform you by e-mail once a decision has been made.

Manuscript Style

There are several categories of material:

Commentaries and editorials

The Editor may invite editorials and commentaries. The Journal will not consider unsolicited editorials or commentaries. Editorials should be approximately 8001000 words and contain no more than 10 references. The title for an editorial should not exceed 85 characters.

Short Papers

These should be less than 2000 words in length (including title page, summary, keywords, main text, acknowledgements, legends, and references), with a maximum of four figures or tables and 15 references. Short papers are rapidly reviewed and published.

Fast Track Papers

These should contain very new “hot off the press” research results of high interest for the research community. These should be less than 2000 words in length (including title page, summary, keywords, main text, acknowledgements, legends, and references), with a maximum of four figures or tables and 15 references. Fast Track Papers will be rapidly reviewed and published.

Regular Research Papers

These are of a more usual length 3000-5000 words (including title page, summary, keywords, main text, acknowledgements, legends, and references), with a maximum of 40 references, and will contain original basic or clinical research findings.

Regular Review Papers

The Editor encourages the uninvited submission of review papers, but the Editor also will specifically invite review papers. Review papers are intended to be well argued, critical reviews of topical subjects which will generate debate and provide direction for future research on the topic.

Letters to the Editor

The Editor welcomes succinct correspondence relating to articles published in the journal, and of an academic and interesting nature.

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